Smithsonian

April 1996

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CÉZANNE (p. 82)

"We have the chance to save one of the last unspoiled ecosystems on our planet." *George Schaller*

George Schaller, science director of International Programs for the Wildlife Conservation Society, has spent four decades in rugged places, studying wildlife, and fighting for its survival. Now Schaller and his Chinese and Tibetan colleagues have helped establish a huge reserve in the Chang Tang.

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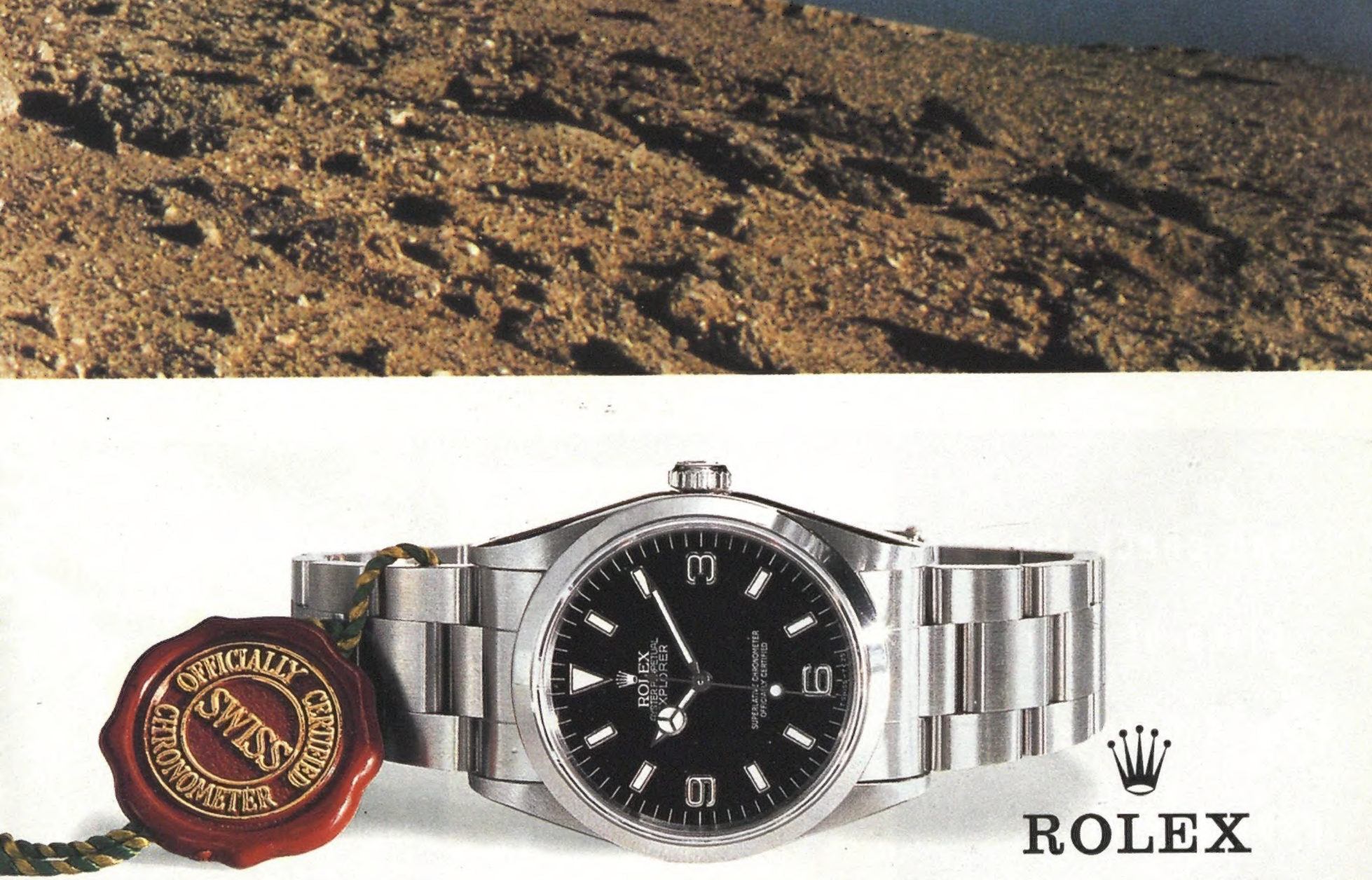

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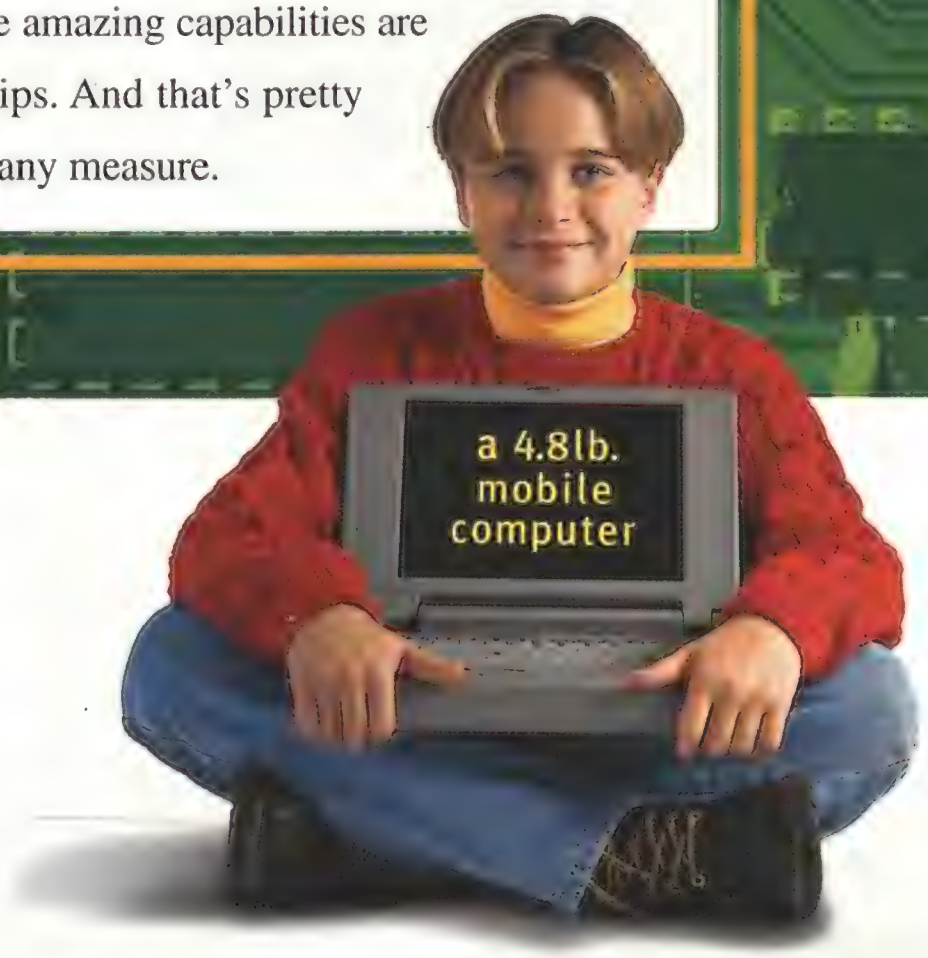

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Cover

Cover:
The Blue Vase (1889-90) is one of only a dozen flower paintings by Paul Cézanne. Indeed, with its careful composition and flat shapes, the picture is as much about a reality of forms and colors experienced through objects as it is about fruits and flowers (p. 82)
Musée d'Orsay, Paris

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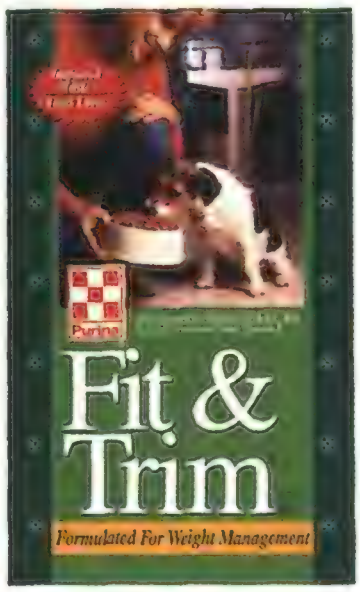

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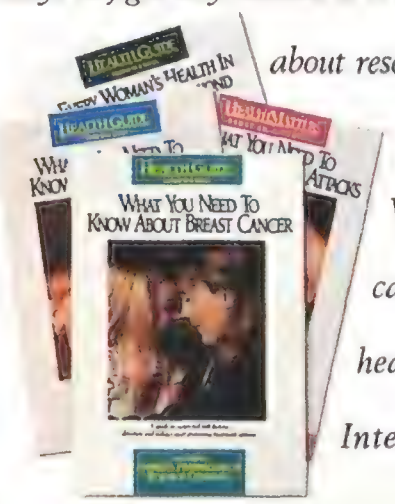

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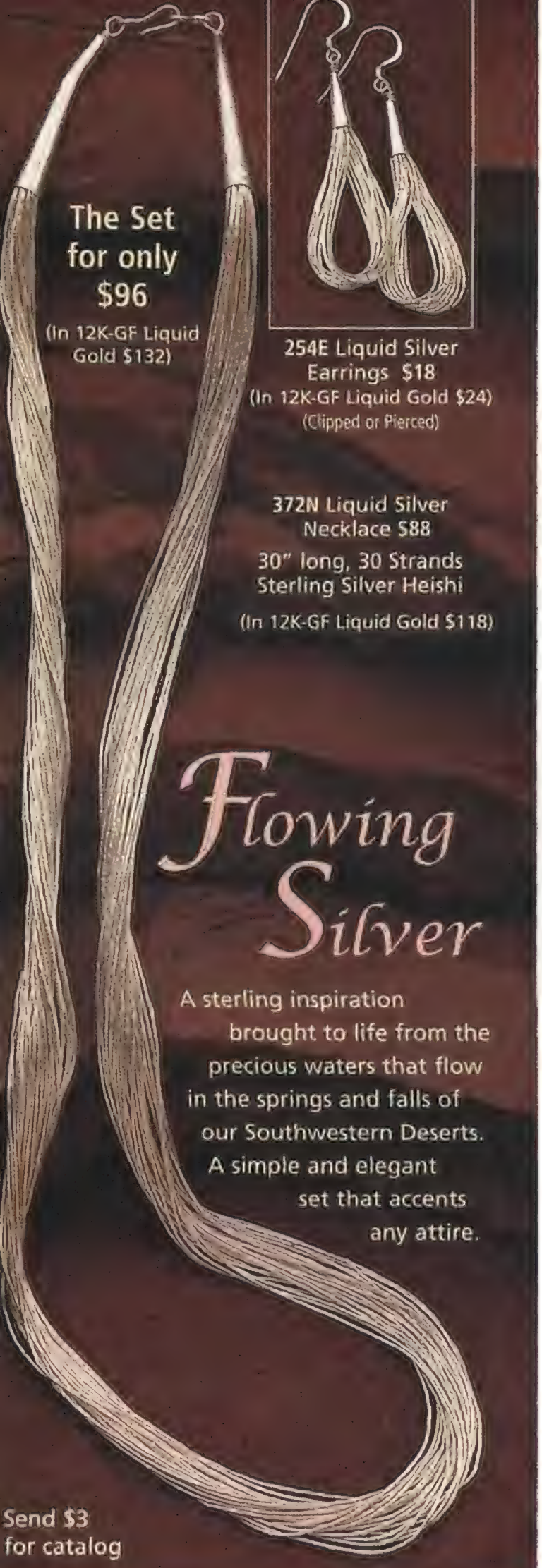

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Secretary Heyman's comments

Smithsonian Perspectives

Volunteer service at the Smithsonian is a time-honored tradition that goes all the way back to Joseph Henry, our first Secretary

The Smithsonian is a national institution built on gifts—not only gifts of objects, money and property but also gifts of time and expertise.

Volunteer service is a tradition that spans the life of the Institution. As we engage in a year-long celebration of the Smithsonian's 150th anniversary, I can think of no activity that has more consistently influenced the accomplishment of virtually every aspect of the Institution's work.

The story of the Smithsonian is also the story of its volunteers—men and women of all ages, from all walks of life and every religious and political persuasion, who of their own free will have sought to be of help to us.

James Conaway's recent book *The Smithsonian: 150 Years of Adventure, Discovery, and Wonder* captures both the spirit and the diversity of volunteer contributions from the Institution's inception to the present day.

Volunteerism did not start at the Smithsonian by chance. It posed a viable alternative for much-needed assistance that the fledgling Institution did not have the resources to accommodate.

Beginning with the first Secretary, Joseph Henry, whose passion was to investigate storm patterns—studies in which he was assisted by hundreds of volunteer weather reporters from across the country—volunteers have served to further the research and other scientific work of the Institution. Ultimately, the efforts of Henry and his dedicated observers resulted in the creation of the first national weather bureau.

Spencer F. Baird, Henry's assistant and successor, enlisted the support of scores of individuals headed for the new Western frontier in the collection of natural history materials. Among his volunteers were farmers, teachers, soldiers, engineers, surveyors and even his own father-in-law, Brig. Gen. Sylvester Churchill, Inspector General of the U.S. Army.

Very often Smithsonian staff members who resign or retire return to the Institution as volunteers. One of the most intriguing examples is that of Mary Jane Rathbun, a noted specialist on crabs who resigned from her position in 1914 so that her salary could be given to her young protégé, Waldo Schmitt. She elected to continue her work here in a volunteer capacity for some 30 more years during which Schmitt became a renowned authority on shrimps. He, in turn, followed his mentor's lead and continued his work as a volunteer at the National Museum of Natural History long after his own retirement.

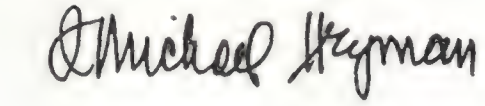
Undoubtedly, one of the largest and most enduring volunteer activities ever undertaken by the Smithsonian was Moonwatch. Organized in 1955 by astronomer Fred L. Whipple, then head of the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, this program spanned almost two decades and engaged 5,000 volunteers from around the world. Collectively, these amateur astronomers logged 400,000 observations of space vehicles orbiting Earth, providing valuable data to the astrophysical community about satellite tracking.

As author Philip Kopper wrote in the 1981 publication entitled *Volunteer! O Volunteer! A Salute to the Smithsonian's Unpaid Legions*, Moonwatch attracted young and old alike, among them doctors, engineers, clergymen, factory hands, and grade school, high school and college students. As Kopper put it, "infectious interest drew hundreds of people away from their television sets and back into a community activity."

With his 1829 bequest to the United States, James Smithson established the philanthropic latitude that has enabled the Institution to fulfill his mandate; he also exemplified during his own life many of the same characteristics we attribute today to those who bear the title "volunteer." Smithson, writes Kopper, "took delight in esoteric study . . . primitive chemistry, and in probing the earth to help discover the infant discipline that became geology." He took his endeavors seriously but worked gratis collecting specimens, writing monographs, performing research and analyzing minerals, one of which was later renamed smithsonite.

In fact, James Smithson worked for the love of it, just as thousands of Smithsonian volunteers have done for the past century and a half to ensure the terms of his will, which stipulated the founding of an institution that would be dedicated to the increase and diffusion of knowledge.

It is altogether appropriate that this nation has proclaimed April 21-27 "National Volunteer Week." As the previous snapshots confirm, the Smithsonian is certainly a stronger and more-viable institution because of the volunteer partnerships that have been forged through the years and that continue today.



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Letters to the Editor

Moths

Dear Sir: Richard Conniff's excellent article on moths in the February issue brought back some unpleasant memories. In 1961, while residing in Colorado, I bought a 1959 Ford Fairlane, the newest car I had ever owned and a "proud purchase." One morning I got into the car to go to work and discovered many hundreds of inch-long, brown miller moths. Every morning for several weeks after that, I headed for Russell Stites' gas station where he would hook up an attachment to his air hose. I'd blow out hundreds of millers until it seemed none remained, but when I'd get behind one of Denver's diesel buses, the fumes would drive out dozens more moths that fluttered madly against my windshield and rear window.

Each day, all day long, millers flew out of my car. At night I rolled up the windows and parked away from any lights, but the next morning I'd open the door to another thousand moths. Dating was out of the question—even *I* didn't get inside the Ford unless I absolutely needed to go someplace. And then, one day, they were just gone, leaving behind little hard-to-clean brown spots on the upholstery and wing-scale dust from their frantic fluttering. I was never happy with that car and finally traded it in.

I've never heard of another car possessed by moths or of another person so plagued by them that they interfered with his love life. The thought of moths makes me shudder. I prefer butterflies.
Roger L. Fleshman
El Paso, Texas

Camelot

Dear Sir: I was quite taken with Caroline Alexander's article on the Arthurian legend since I, too, am a devoted fan of *Rex Quondum, Rexque Futuris.* T.H. White's *The Once and Future King,* a 20th-century classic, converted me 30 years ago, and I have reread it every 12-18 months since.

Two other masterpieces I especially recommend to other SMITHSONIAN readers are John Steinbeck's unfinished adaptation of Thomas Malory's epic poem *Le Mort d'Arthur* into *The Acts of King Arthur and His Noble Knights,* and Mary Stewart's Merlin trilogy: *The Crystal Cave, The Hollow Hills* and *The Last Enchantment.*
Max M. Wertheim
Huntington, New York
Pictures, such as the 15th-century manuscript illumination (below), offer other perspectives on the legends. Ed.

Dear Sir: The sword Excalibur, which the future king Arthur pulled from the stone in legend, appears in the folklore of the Sarmatian tribes before the birth of Christ. In their epic poem about their tribal hero Batraz, the dying king twice orders that his sword be thrown into the water. In its earliest form, *Caliburnus,* the word we know as "Excalibur," is derived from the Latin word *chalybs,* meaning "steel," which comes from a Greek word for the Sarmatian Chalybes, a tribe of metalsmiths working in geometric shapes.

The Sarmatians were nomadic horsemen living in the Caucasus region of present-day Russia who had moved west by the first century A.D. to the Danube frontier. The Roman emperor Marcus Aurelius made a treaty with the warlike Sarmatians in 175 A.D. and hired thousands of their warriors to serve in his army. He sent more than half of the cavalrymen to Britain to fight the Picts in what is now western Scotland. Their commander was a Roman soldier named Lucius Artorius Castus. Their symbol was a sword thrust into the ground or a wooden platform, which had been the symbol of their war god.

In the early fifth century, the troops moved south to fight a flood of Irish invaders in an area now called Cornwall, and they remained there to establish a new headquarters at a hill-fort ten miles south of Tintagel. Another possible King Arthur was a second Lucius Artorius Castus, who was born in the fort

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and, like his first-century ancestor, became a cavalry officer.

The fort is now called Castle Killibury and is a good place to watch for Arthur's ghost next Christmas Eve.
John Guenther
Harrison, New York

Dear Sir: A reference to Arthur occurs rather incidentally in the Welsh poem *Y Goddodin*, which is attributed to the bard Aneirin. *Y Goddodin* tells of the non-Arthurian battle of Castraeth and praises one of the heroes who "sated the ravens on the wall [slew many of the enemy] though he was not Arthur."

The only extant manuscripts of the poem date to the 12th century A.D., but most scholars agree that it is much older and probably written closer to the time of the battle.
J.A. McConney
Raton, New Mexico

Dear Sir: Geoffrey Ashe suggests in his book *The Discovery of King Arthur* that Arthur died and was buried in France. The legends agree that Arthur had a continental campaign, although most of them place it at the midpoint or early in his career. By piecing together bits of data, Ashe concludes that the Romans, beset by Gauls, sent out pleas for help in about 470. Only Arthur responded, but by the time he reached the battle with his forces, the Romans had been whipped and had retreated. The Gauls drove Arthur's army back toward Avalon, where he was killed and buried.
Georgia A. Bender
Worthington, Pennsylvania

Dear Sir: Your beautifully written and informative article on King Arthur and Camelot takes us 100 miles west from Cornwall's Dozmary Pool to the town of Amesbury. Traveling west 100 miles would put us over the Atlantic Ocean. Amesbury is about that far to the *east* of Dozmary Pool, not far from Stonehenge on the Salisbury Plain.
R.W. Chamberlin
Flournoy, California
In preparing to go to press, we inadvertently turned "east" into "west." Ed.

Noise

Dear Sir: Richard Wolkomir's article on curbing unwanted noises reminded me of a problem an ESSO [now Exxon] customer in the New York-New Jersey area asked us to solve more than 25 years ago. Jerry Evans, our worldwide expert on lubricating and hydraulic oils, was called in to quiet a very upsetting sound at a crematorium. After a funeral service, as the descending lift carried the body down to the furnace, there was a very loud screeching noise that sounded as though the deceased were screaming upon entering the fire. Jerry recognized the sound as hydraulic valve chatter and quickly fixed it.
Walter E. Borden, III
St. Simons Island, Georgia

Dear Sir: While I was reading your article on reducing noise, my 15-month-old daughter interrupted me by emptying pots out of the kitchen cupboard. Meanwhile, the 3-year-old was watching his construction video, and the teenager was practicing his electric guitar. Is there any antinoise machine in the works for a three-child household?
Tracey Wilson
Gainesville, Florida

Square dancing

Dear Sir: I enjoyed square dancing in college, where it was considered vigorous enough exercise to fulfill a physical education requirement. My favorite square dancing memory, however, is of the 1963 Minnesota State Fair. I was living on a graduate student stipend, but I scraped together enough money to attend and got a front-row seat at my first horse show. I've forgotten everything else about that show except the demonstration of square dancing on horseback. The partners wore matched outfits and their horses wore matched tack. Several squares wheeled, turned and even do-si-do'd with amazing speed and synchronization. I've never seen an equine square dance since, but the image remains vivid.
Ellen V. McEvoy
St. Paul, Minnesota

Dear Sir: My wife and I have been square dancers for eight years in Connecticut, where we belong to two clubs. We winter in Florida, where we belong to three clubs. It is a marvelous way to meet people of all ages. There is no drinking, smoking or cussin' at any of our events.

The exercise is great, too. I had open-heart surgery 11 years ago and the doctor told me I'd need another operation in 4 or 5 years. With my doctor's permission, I took up square dancing, and I recently had the best stress test ever. The cardiologist jokingly said, "I guess you danced away the plaque."
Walter Carter
Fort Pierce, Florida

Object at Hand

Dear Sir: Edwards Park's column about the British genius Charles Babbage, who conceived the idea for the computer 150 years ago in his Difference Engine, was fascinating. What caught my attention in the story was the name "Ada," referring to the daughter of poet Lord Byron. Although Augusta Ada Byron did not receive recognition in her day for her writings that explained Babbage's work, she was famous enough for the U.S. Department of Defense to name its common computer programming language for her: Ada.
Betty Anne Royal Spiegel
Chevy Chase, Maryland

Dear Sir: In 1991, science fiction writers William Gibson and Bruce Sterling published a wonderful novel, *The Difference Engine*. It is an alternative history in which Charles Babbage's concept becomes a fully functional mechanical computer in the early 19th century. The predictions of the social effects are tremendously entertaining and thought-provoking.
Jay C. Smith
Bakersfield, California

Transmit mail for consideration in this column to edletters@aol.com or post it to Letters Editor, SMITHSONIAN, *900 Jefferson Drive, MRC 406, Washington, DC 20560.*

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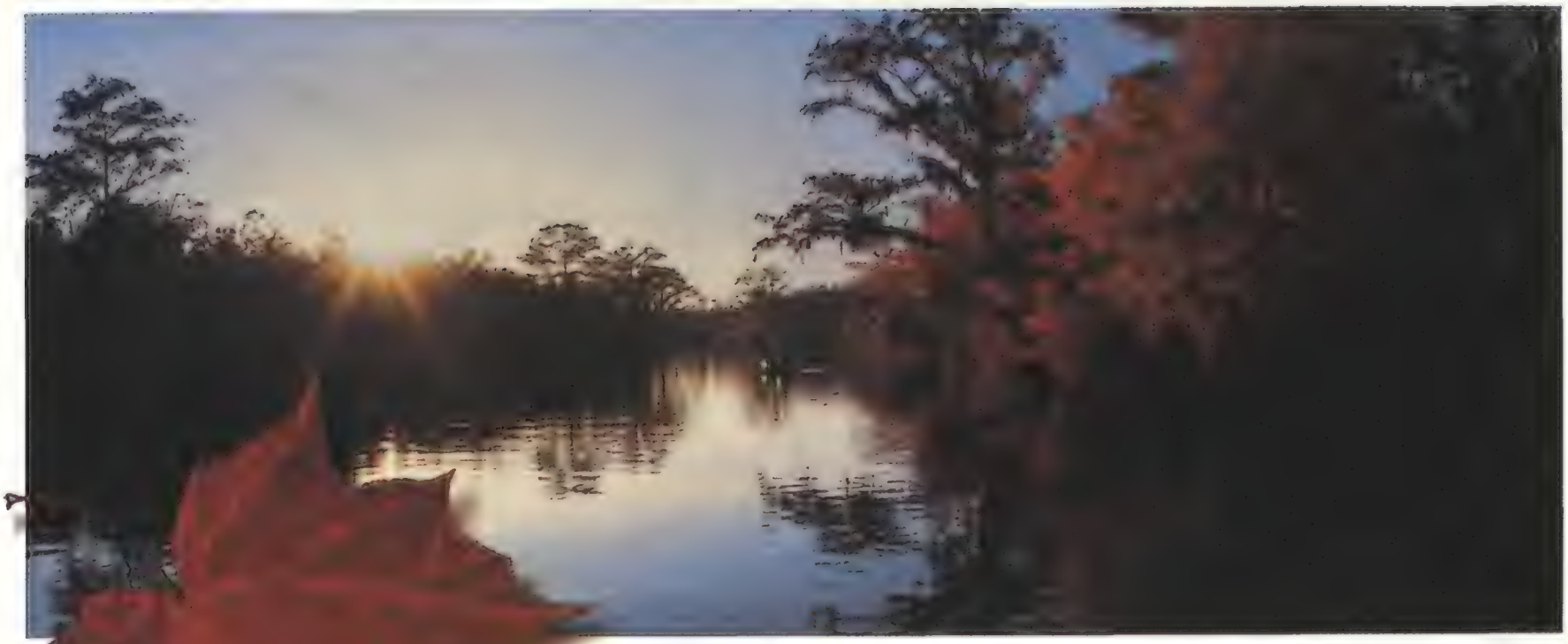

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for our kids. It just feels good to be working for a company that's doing something about it."

Mason Lilley, Forester

Georgia-Pacific

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Around the Mall and Beyond

By Michael Kernan

'Red-hot, beat-me-down, bring-you-up swing tunes' are just part of Radio Smithsonian's Black Radio: Telling It Like It Was, *the story of radio's role in transforming the African-American community*

For blacks who migrated to the North in the 1940s, black disk jockeys were cultural heroes—newspaper, mayor and preacher combined, shaping hearts and minds.

"Dr. King had his offices right under the radio station, and Ralph Abernathy and Andrew Young and all of them would come there, and what they would do is take a broomstick and hit on the ceiling. I would announce a 'pause for a message from Dr. Martin Luther King jr., president of the Southern Christian Leadership Conference,' and I'd let the mike out the window to the first floor, and Dr. King would bring the mike in his window and make the speech. . . ."

A landmark 13-part series, *Black Radio: Telling It Like It Was*, has recently been distributed by Public Radio International to radio stations around the country. Compiling vintage radio broadcasts by the first black disk jockeys, their music, their wonderful stories, their vital role in the civil rights movement, the series documents the struggle to gain influence over how blacks are portrayed on the air and to achieve station ownership. The Smithsonian has, with this monumental project, made a signal contribution to American history.

And it's funny.

Doug (Jocko) Henderson had a "rocketship" show in Philadelphia, featuring rocket whooshes and a rhyming patter that kids all over town picked up. Any black pop artist who wanted to be a star had to make friends with platter spinners like Jocko.

"One night about 4 in the morning," he recalls, "somebody was kicking on the front door. I was sound asleep. Said to my wife, 'Who in the world is that?' I put my bathrobe on, put my gun in my pocket, went down and hollered through the door, 'What you want?' He says, 'Jocko, my name is Sam Cooke and this is Bumps Blackwell, my manager, and we have a record we think is gonna be a big smash, and we wanted you to hear it.' Well, I heard it, and it was 'You Send Me,' and in three weeks it went to Number One in the country."

In the 1940s during the great migration of African-Americans from the South to the industrial cities of the North, disk jockeys rapidly turned themselves into a combination newspaper, mayor and minister.

They also promoted products to stay on the air. B. B. King tells of writing a jingle for a new tonic called Pepticon. It was amazingly popular with the elderly and especially with church folk. He couldn't understand the appeal of the stuff. Then he discovered the secret: it was 12 percent alcohol!

Announcers were sharply aware of their importance in the community. "We didn't know," says one DJ, "that we would be sent where preachers could not go, shaping the hearts and minds of people. But we did a good job." Along with the scat songs and ballads, along with Chuck Berry and James Brown and the Platters, the series presents the magnificent voice of Marian Anderson singing "My country, 'tis of thee . . ." and a docudrama about a noted African-American surgeon.

Black Radio was put together by the Smithsonian's Office of Telecommunications with the help of grants from the Corporation for Public Broadcasting and the James Smithson Society. Jacquie Gales Webb, a veteran producer at Radio Smithsonian and a DJ herself, spent three years gathering tapes of historical broadcasts from audio collectors and DJs around the country. "Thanks to our cutting-edge digital equipment, we were able to edit together the elements we wanted very quickly," says Webb .

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"Black radio was very important," she explains. "In most cities there was only one black station, and it gave information, inspiration and education, in the sense of what was going on in the community. Some have even said that black radio was comparable in power to the black church. Radio was very big in Chicago, Detroit, Philadelphia, New York, Washington, D.C., Cincinnati and in the South—Nashville, Memphis and Atlanta."

Jack Cooper of Chicago is credited with the first black DJ program. He bought time from WSBC, a foreign-language station, got his own sponsors and went on the air, speaking the King's English. But his colleague Al Benson, the king of black radio in the late '40s and the '50s, changed all that. He addressed listeners, many of them Southern migrants, in their own slang, loud and loose. DJs started developing their own unique spiels and used all kinds of street lingo. The style caught on instantly. In fact, many white DJs imitate that hard-charging manner to this day, whether they know it or not.

The whole thing had started, according to Webb, as early as 1931, in the days of live performers, when a radio pianist quit in a union dispute. Cooper simply wound up a phonograph and set it in front of the mike. "And that's why he's called the first DJ."

Cooper also pioneered *The All-Negro Hour*, mirroring the network variety shows with skits, comedy, drama, news and whole choruses of performers.

"There were family programs like *The Wings Over Jordan Choir*, in the days when families would sit around the radio together. Every Sunday it was broadcast out of Cleveland over CBS. The choir toured Europe, too. All the older people remembered it."

Perhaps the finest hour of Black Radio came in the '60s. When the 1968 riots threatened to burst Detroit at the seams, a DJ named Martha Jean (The Queen) Steinberg came on the air, played gospel music, talked and prayed, and calmed people. However, Steinberg and other black DJs also understood the need for humor, to get audiences to listen. She recalls, "We were considered clowns, we were considered ignorant, we were considered jokes. But if we hadn't been laughing we couldn't have got our point across. We had to be clowns: we are bright, intelligent people, independent thinkers, philosophers, you know?"

Black Radio, produced by Jacquie Gales Webb, is hosted by Lou Rawls.

"She developed into a gospel announcer," Webb told me. "No more R&B. She had a salute to blue-collar workers. She'd get on and tell housewives when their husbands were getting their paychecks so they could go down to the plant and bring them home. Eventually she became an ordained minister. She has her own station now, has people working for the poor and feeding the hungry."

Black DJs did more than just support the civil rights movement; they embodied it. Their charismatic presence also helped to alert white business leaders that black programming represented tremendous economic power and political influence.

DJs were not merely disembodied voices, abstractions floating on the airwaves; if you lived in their city you could actually see them in nightclubs or in their studios. With his wonderfully raspy, avuncular voice, series host Lou Rawls talks about Al Benson: "I grew up hearing him spinning records in his record store window. We used to go there and watch all the time, especially on weekends: he'd have recording artists come in as guests. We got to see all the stars."

And the black DJs spawned a sea change in popular music. Without them there wouldn't have been rock'n'roll. They turned young blacks and hip young whites on to rhythm and blues, an essential precurser of rock'n'roll. One reason DJ Tommy (Dr. Jive) Smalls was able to introduce Bo Diddley on *The Ed Sullivan Show* in 1955 was that Sullivan had seen newsreels of the crowds attending Smalls' R&B shows at the Apollo Theater in Harlem.

All through this sparkling series are snippets from old tapes, rarities in themselves, for DJs were a peripatetic lot and didn't bother to save the thousands of hours' worth of broadcasts they had logged. A young Memphis DJ and singer named Rufus Thomas does a hilarious commercial for Pink Pussycat wine. Jocko Henderson tells how he introduced the Supremes at the Apollo and had to literally pull Diana Ross, still a shy girl, from behind the curtain.

Art Neville, eldest brother and keyboardist in the Neville Brothers band, tells about Dr. Daddy-O's breakfast program on WYLD. "One of the sponsors was a bacon company, and I could smell it—it sounded as if he was actually frying bacon in the studio. I got a chance to go there one morning, and there was no bacon. He had the cellophane off a pack of cigarettes and was crumpling it in front of the microphone."

One episode in the series will concentrate on white DJs like Wolfman Jack (who recorded an interview for the program before his recent death), Hoss Allen in Nashville and Hunter Hancock in Los Angeles. They all learned a lot about style and presentation from black announcers.

Today, Webb says, what used to be called black radio is "urban radio." "Many stations don't call themselves 'black,' either. Because the advertisers wouldn't buy black. They want 'adult,' 'contemporary,' 'urban.' They say, 'Black? What do you mean? I need people from 21 to 45 because they buy the most stuff.'"

Well, you can give it a different name, but like the Cheshire Cat's smile, it won't go away. This Smithsonian series is a celebration of the songs, the names, the energy, the sheer unbuttoned joy that radiated from black radio. "Lawdy Miss Clawdy." Doctor Hepcat. Poppa Stoppa. "Green Onions" (first heard on WLOK at 7 in the morning, sold out in the stores by 9 A.M.). Booker T. and the MG's. Dizzy Lizzy. Eddie O'Jay. Dr. Daddy-O (not to be confused with Daddy-O Daylie). Theo Wade, better known as Bless My Bones, who used to make what he called "goodwill announcements" on the air, such as, "One of our friends has lost his false teeth, like to help him get them back. . . ."

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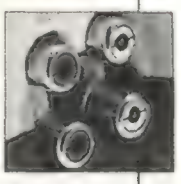

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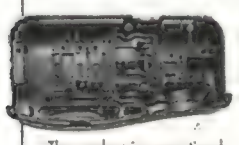

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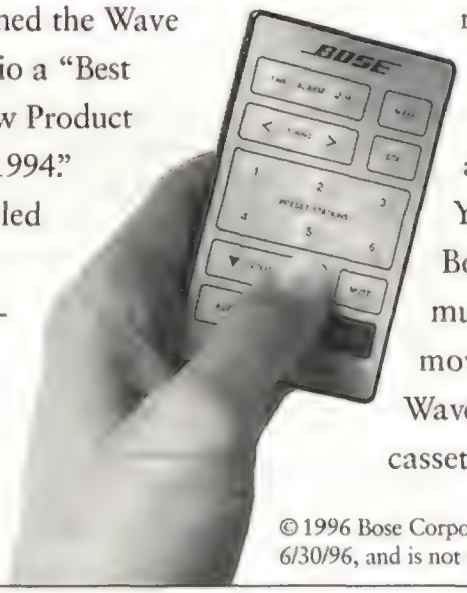

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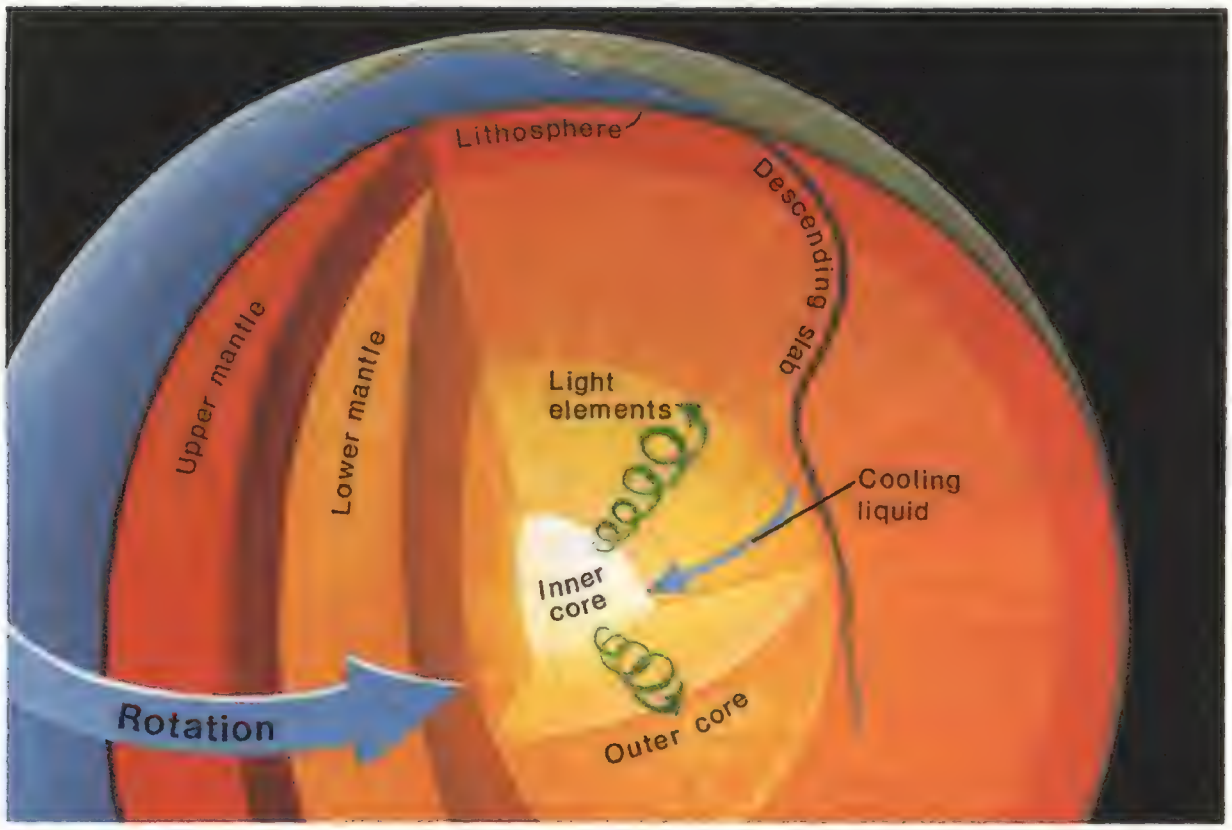
Phenomena, Comment and Notes

By Stearns A. Morse

When a drop of rain carries a particle of dirt off the land and into the sea, there are repercussions from deep within Earth to the nearer reaches of space



A slab of descending crust and mantle cools some of Earth's liquid outer core, which sinks to the solid inner core. There it solidifies, releasing lighter elements that stir the outer core, generating our planet's magnetic field in the process.

When drops of rain fall, some of them flow downhill, each carrying a bit of dirt. As a result, over time the landscape changes from steep to shallow slopes. The land surface erodes away toward sea level. Like a boat in the water, Earth's continental crust displaces its own weight in the underlying layer of denser mantle rock. As its cargo of eroding soil and rock is thrown overboard, the crust loses weight and rises. To accommodate this change, some hot mantle rock must flow in beneath the continent, just as water flows in under a boat that is rising out of the water as its load is lightened. The only difference is the speed at which it happens: hot rock flows slowly, a finger's width a year.

The mantle rock that flows inward under the thinning continent must come from somewhere and, in turn, be replaced by other hot mantle rock. Where does it come from? We know that fresh mantle rock rises up at the mid-ocean ridges, where tectonic plates pull apart to release hot material coming up from below (SMITHSONIAN, January and February 1975). Some of that mantle rock becomes oceanic crust, adding to the plates' trailing edges as they move apart. And some of it flows underneath the oceanic crust to fill the space being created by that lightening, rising continental crust. All this moving mantle rock is, in turn, replaced by the upward flow of hot rock from deeper in the planet. We face the astonishing fact that raindrops falling on land indirectly cause hot, flowing rock material to rise up from Earth's depths.

Until it nears the surface, the flowing rock we have seen in action is flowing in a plastic way, deforming like steel squeezed between rollers. But when hot rock rises from the interior under ocean ridges, it partly melts into a liquid as the pressure on it lessens. The melted rock travels through pores and cracks until it collects and rises and erupts in submarine volcanoes. The cooling lava, transferring its heat to the water, helps the Sun heat the ocean, powering the wind and producing the rain.

One drop of water; mantle flow; volcanism; rain. Loop closed. We are back at the beginning of the cycle.

Eventually, mantle rock flowing beneath the oceanic crust encounters, pushes and slides past the colder, more-rigid rock material of the continent. Something in that crust breaks, and there is an earthquake, because cold rocks break rather than flow. One drop of water. One Northridge earthquake.

The flowing mantle eventually cools and dives back down into the earth in subduction zones, producing more earthquakes and volcanoes as it does, especially in the "ring of fire" around the Pacific. No ocean floor is older than 180 million years; all of it goes down the tubes sooner or later.

If a piece of tectonic plate is subducted, its place at the surface is taken by new material somewhere else, at an ocean ridge. In North America we ride westward away from the Atlantic Ridge on the North Atlantic Plate; at the Ridge new rock is made from magmas that come up from hot mantle. Meanwhile, the western edge of the Pacific Plate slides down into the mantle. To paraphrase John Donne, no plate is an island, entire of itself. All motions are interrelated. One drop of water may set the whole thing going.

Our planet knows only one thing: how to get rid of heat. The silicate mantle, amounting to two-thirds of Earth's mass, contains traces of radioactive elements that heat the planet a bit as they decay. Beneath the mantle is the hot

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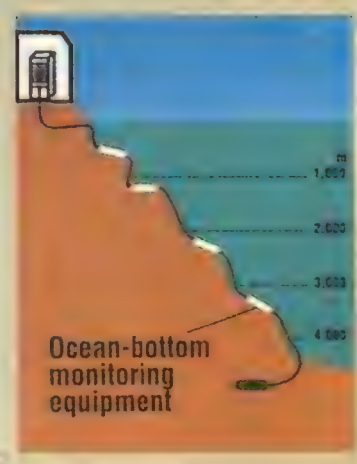

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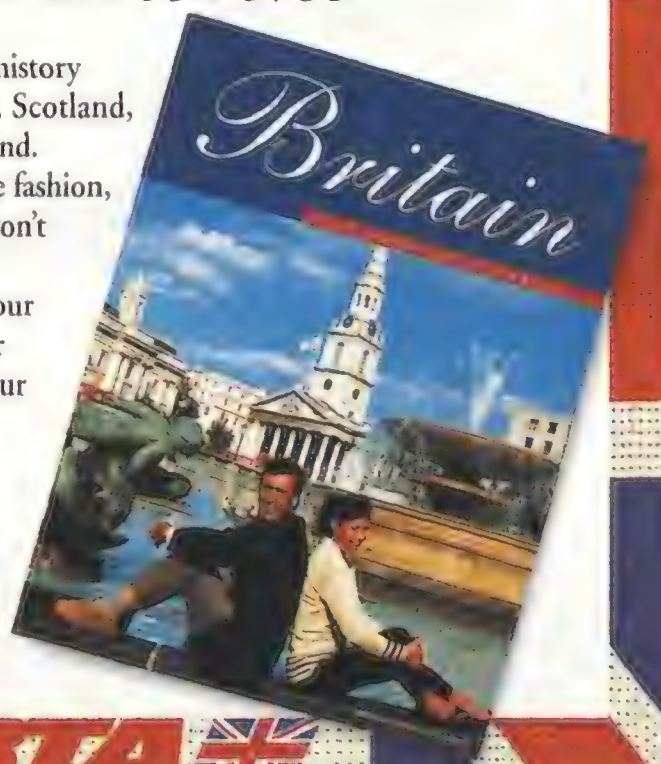

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metallic core, most of the other third of Earth. The cooler part of the descending mantle eventually touches the core. Heat leaks upward out of the molten core faster than usual through this cold finger. Such cooling causes a little bit of the liquid-metal outer core to sink and solidify as crystals onto the solid-metal inner core at the center of the planet.

Light, nonmetallic elements like sulfur are released at this boundary. This light material rises, stirring the liquid outer core in the process. Responding to Earth's rotation, it swirls in a spiral up toward the rocky mantle. Flowing electrons in the molten nickel and iron produce an electric current. Earth rotates the electric current, making a dynamo and thereby producing a magnetic field.

Cold rock replacing hot rock at the core causes a little of the liquid outer core to solidify, setting off a train of events that result in a magnetic field. Raindrops are the cause of Earth's magnetic field? Maybe just a little bit.

If a disturbance in the mantle interferes with the flowing source of the magnetic field, it may die away and reverse its polarity (the magnetic north pole will become the south pole, and vice versa). Such reversals happen every few hundred thousand years or so. When Earth's magnetic field is weak during the switch, charged particles that are normally trapped in that field hit the surface all over the globe instead of only at the magnetic poles (where they cause the auroras borealis and australis). This ionizing radiation damages the DNA of all living things. Rain causes mutations? We are getting far from the cause here, but the thread still holds.

Some of the atmosphere's moisture falls to earth as snow. In some cold places this stays year-round, making ice sheets and their peripheral glaciers. The weight of the ice sheets presses down on the rocks underneath, and the base of the continent sinks into the mantle. The mantle flows away from that place. If the ice sheet becomes very thick, the heat rising into it from within Earth (doing what Earth does best) may melt the bottom layer of the ice. When this happens for long enough, the ice rides away on a film of water and crushed rock at a rate of perhaps a finger's width a minute. It reaches the ocean and breaks up into giant icebergs. These sail across the North Atlantic to Spain and France, changing the circulation of the ocean as they go. This, in turn, could cause the ice to

begin to grow again, or maybe not, depending on the trend of things that we still do not understand (*Phenomena*, August 1993 and September 1995). If the ice sheet then melts away, the land bounces back up and the rocky mantle flows right back into place beneath it. One drop of water (disguised as a snowflake); one ice sheet gone; one rebounding continent exposed.

When, you ask, did this ever happen? Oh, only about 10,000 years ago and many times before that for 70,000 years (and, we expect, for thousands of years into the future); only a tick in time for Earth. The record of these glacial splurges lies in the sediment at the bottom of the ocean.

Some of the drops of water that fall to the ground don't just flow to the sea: we drink them first. Some have been in the ground a long time (the water we drink today may have been in the ground for a thousand years). We are glad of fresh water but may use it up without suspecting we are mining a resource. A millennium of tree ring records in the rain shadow of the Sierra Nevada show that what they call drought in Reno is really normal. The export of Colorado River water westward was premised on high flows that have existed only rarely in the long term.

There is just one Earth. It is a closed system except at the outer reaches of the atmosphere; except for meteorite infall; and except for the blast of heat and subatomic particles from the Sun. (And except for invisible but very real gravitational fields: the Sun and Moon cause the tides that clean our shores twice a day.)

The point of this essay is to demonstrate the unity of Earth processes and therefore the unity of Earth research. If one drop of water affects the whole Earth, all research bearing on our planet is applied research. The distinction between pure and applied research in earth science is fuzzy and artificial. Earth's inevitable, enduring pulse will govern our activities whether we recognize it or not. We should pay attention. If we are arrogant about Earth, it will make us poor. If we understand Earth, it will make us rich.

One drop of water. Knowing it can help us prosper.

Stearns A. Morse, professor of geology at the University of Massachusetts, Amherst, marks the 75th anniversary of the American Geophysical Union by including the work of all ten of its sections in this column.

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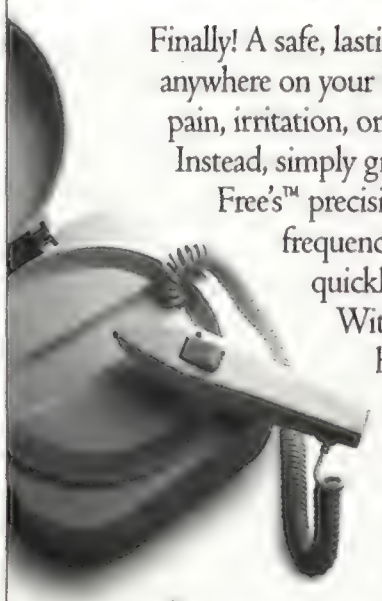

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Smithsonian Highlights

Plan a Smithsonian visit in 1996!

Join in the fun as the Smithsonian celebrates its 150th anniversary with a year of special exhibitions and events. *Receive a free Associates' planning packet.* Write Smithsonian Information, Smithsonian Institution, Washington, D.C. 20560, or call (202) 357-2700 (voice) or (202) 357-1729 (TTY), 9 A.M. - 5 P.M., Monday-Friday; 10 A.M. - 4 P.M., Saturday-Sunday. *Note:* Parking near the Smithsonian is limited. The Metrorail subway system, convenient to all museums, has parking available at some stations (details in packet).

Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M. - 4 P.M. daily—in the Castle. Special materials await you there. The National Museum of Natural History's Court Dining Room offers Associates a discount on daily buffet service, 11 A.M. - 3 P.M.

Museum Hours

Smithsonian museums are generally open 10 A.M. - 5:30 P.M. daily, except December 25. Hours at the National Zoo are 9 A.M. - 4:30 P.M. daily for buildings, and 8 A.M. - 6 P.M. for grounds.

Smithsonian Web Site

The Smithsonian home page on the World Wide Web (http://www.si.edu) offers on-line information about exhibitions, collections, events, products, and exhibits and activities commemorating the Institution's 150th anniversary.

Smithsonian Craft Show

The 14th annual Smithsonian Craft Show, sponsored by the Women's Committee of the Smithsonian Associates, will be held April 25-28 at the National Building Museum, Fourth and F Streets, N.W. For hours, admission fees and advance tickets, call (202) 357-4000. See *Highlights Continued*, page 34.

An Anna's hummingbird partakes of nectar from the brilliant red flower of a scarlet sage plant in the new "Pollinarium" installation at the National Zoo.

America's Smithsonian

Kansas City, Missouri (April 10-May 19), at the H. Roe Bartle Hall. Centerpiece of the Institution's 150th-anniversary celebration, the traveling exhibition showcases more than 300 treasures from the Smithsonian's collections. Highlights of the show include such artifacts as George Washington's sword, the ruby slippers from *The Wizard of Oz*, Amelia Earhart's flight suit, dinosaur bones and a moon rock. *Note:* Admission is free, but passes are required. Advance passes may be obtained for a service fee of $3.50 each by calling 1-(800)-913-TOUR.

Special April Exhibits, Events

National Air and Space Museum

The Violent Universe (through October 30) Exhibit looks at the work of NASA's Compton Gamma Ray Observatory, a satellite launched in 1991.
The Enola Gay (runs indefinitely) Exhibition features the forward fuselage of the *Enola Gay*, the B-29 that dropped the atomic bomb on Hiroshima.
The New Solar System (runs indefinitely) New Einstein Planetarium show takes viewers on a multimedia space jaunt.

National Museum of Natural History

Ocean Planet (through April 30) The causes and consequences of environmental threats to the world's oceans.
Landscape Kimonos by Itchiku Kubota (through April 14) Japanese artist Itchiku Kubota has created an arresting series of handcrafted kimonos.
Gem and Mineral Hall Gallery is closed for renovation until late 1997. The famous Hope Diamond is on view on the second floor of the Rotunda.

National Zoological Park

Pollinarium New permanent exhibition examines the means of plant reproduction and explores symbiotic relationships found in the pollination process—living plants, hummingbirds, butterflies.

National Museum of American History

Smithsonian Institution Staff Photo Contest Winners (April 2-September) Display of the results of an Institution-wide photography contest held in celebration of the Smithsonian's 150th anniversary.
Antonio Jacobsen: Painted Ships on Painted Oceans (April 16-September 8) Works by the Danish-American artist (1850-1921) who became America's most prolific pierhead painter.

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Photography by Jörg Reichardt, courtesy of Deutsche Grammophon

Mathematical Instruments of Spain and Spanish America (opens April 22) Show looks at the Hispanic influence on the way many people reached, charted and measured America.
Ellington Art Show (April 24-May 26) Annual display features works by student artists from schools in the Washington, D.C. area.

National Postal Museum
Located next to Union Station on Capitol Hill, the museum tracks the history of the nation's mail service.
Japanese Rarities (April 30-October 1) Display of rare Japanese philatelic items.

The Castle—Great Hall
Smithson's Gift Permanent display tells the story of the British scientist whose bequest founded the Institution 150 years ago.

Freer Gallery of Art
In Human Form: Images of the Secular and Divine in Chinese Painting (through August 4) Exhibition examines how actual and symbolic images of people shape and inform Chinese painting.

Arthur M. Sackler Gallery
The Power of the Pen: Islamic Calligraphy in the 14th Century (through May 27) Exhibition explores the blossoming of Islamic calligraphy.
Traders and Raiders on China's Northern Frontier (through September 2) Artifacts from the first millennium B.C.

National Museum of African Art
Seydou Keita, Photographer: Portraits from Bamako, Mali (1950-1960) (through July 28) Evocative portraits by the self-taught photographer from Bamako, Mali.
The Ancient Nubian City of Kerma, 2500-1500 B.C. (runs indefinitely) Objects reveal wealth, artistic traditions, of the city.

Hirshhorn Museum & Sculpture Garden
Georg Baselitz (through May 5) Retrospective of work of the German Neo-Expressionist features paintings, sculptures.
Directions—Beverly Semmes (through June 23) Installation of monumental fabric sculpture by the New York-based artist.

Arts and Industries Building
Visual Journal: Harlem and D.C. in the Thirties and Forties (April 18-October 6) Works by such African-American photographers as Robert H. McNeill, Gordon Parks and Robert S. Scurlock.
Posy Holders New permanent display features posy holders fashioned from precious metals and semiprecious stones.
Discovery Theater
Peace Tales (April 1-26) For showtimes, ticket prices and reservations, call (202) 357-1500 (voice or TTY).

National Portrait Gallery
1846: Portrait of the Nation (April 12-August 18) Exhibition focuses on the Institution's founding year—portraits, paintings, maps, political cartoons and other memorabilia. See page 38.

National Museum of American Art
Chaim Gross: A Celebration (through May 13) Exhibit explores the artist's affinity for the subject of the acrobat.

Renwick Gallery
Mark Lindquist: Revolutions in Wood (through July 7) Retrospective surveys the art of the distinguished woodturner.
Lia Cook: Material Allusions (through July 7) Innovative wall hangings combine weaving and painting.

Anacostia Museum
English and French Caribbean Music in Washington, D.C. (through May) Exhibit examines the development of Washington's Caribbean music community.

Heye Center, National Museum of the American Indian (New York)
Creation's Journey: Masterworks of Native American Identity and Belief (runs indefinitely) First of three inaugural exhibitions features objects dating from 3200 B.C. to the present.

Cooper-Hewitt, National Design Museum (New York)
Gallery Closing The exhibition galleries of the museum are closed to the public for renovation until September 17. Selected exhibitions will be held off-premises during this period.
The Avant-Garde Letterhead (through May 8) Exhibit held at the American Institute of Graphic Arts includes examples of writing paper, postcards, envelopes and related material.

Exhibition catalogs

Catalogs currently available include:
America's Smithsonian ($45/$24.95 paper)
Georg Baselitz ($65/$39.95 paper)
Itchiku Tsujigahana ($39.95 paper)
Ocean Planet ($6.98 paper)
Mark Lindquist: Revolutions in Wood ($22.95 paper)
Lia Cook: Material Allusions ($16.95 paper)
To order, send check or money order to Smithsonian Museum Shops, P.O. Box 1140, Newington, Virginia 22122. Include 15 percent of purchase to cover postage, handling (minimum, $4.50).

Smithsonian on the Air

Black Radio: Telling It Like It Was An unprecedented documentary about radio and the 20th-century transformation of the African-American community, hosted by Lou Rawls. Check local public radio listings. See *Around the Mall*, page 22.

The Smithsonian Associates, U.S. and International Events

The "Smithsonian Voices of Discovery" program will come to Kansas City, Missouri, April 28-May 7. Smithsonian curators will lecture on topics ranging from Native American art to planetary geology. The program is presented in conjunction with "America's Smithsonian," on view through May 19 at Kansas City's H. Roe Bartle Hall.

Associates in the Kansas City area will receive brochure invitations for the events. For further information, contact: U.S. and International Events, 1100 Jefferson Drive, S.W., MRC 702, Washington, D.C. 20560; or call: (202) 357-4800, ext. 274.

The Smithsonian Associates, Resident Program

To become a member, or for fee and ticket information, call (202) 357-3030. April events include:
Queen Nefertari's Tomb: Paintings Priceless as Any Jewel (April 17; 6 P.M.) Egyptologist David Silverman offers a rare look at the magnificent tomb art.
The White House Garden: A National Treasure (April 23; 6 P.M.) Lecture by author William Seale.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some April exhibits:
• Lawrence, Kansas (April 20-June 2) *The Tongass: Alaska's Magnificent Rain Forest*, Natural History Museum, University of Kansas.
• Lompoc, California (April 27-June 9) *The Prairie Schoolhouse: A Photo Essay by John Martin Campbell*, Lompoc Museum.

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Highlights Continued

A showcase of American crafts

A surprising and engaging variety of contemporary crafts will be on display at the 1996 Smithsonian Craft Show. Organized by the Smithsonian Women's Committee, the 14th annual juried show and sale will be held April 25-28 at the National Building Museum, Fourth and F Streets, N.W. (For hours, admission fees and advance tickets, call (202) 357-4000.)

When three jurors tackled the task of winnowing out 120 participants from the 1,200 applicants this year, they agreed that what they were looking for, in addition to high-quality craftsmanship, was innovation and continuity of vision. As one juror put it, they were seeking "artists who had found their own voice." The "voices" of the successful contenders ring clear.

"It is my desire to present objects familiar enough to evoke personal associations, yet subtle enough to raise questions in the mind of the viewer," states Vermont ceramist Emily Rossheim. Her simple, textured forms make use of visual effects that belie the nature of clay and serve to create an air of mystery.

"A successful piece should be a catalyst for thought," maintain Colorado goldsmiths Jeff and Susan Wise, whose elegant jewelry invokes a sense of timelessness and ceremony. "We want the viewer to be engaged."

Akira Blount, of Tennessee, learned how to sew from her grandmother and has been making dolls since 1969. "I am still fascinated with the magic that happens when needle meets cloth and when human encounters effigy," she says.

Diane M. Bolz

Michael Sherrill's clay teapot takes dynamic sculptural form.

Vibrant handblown glass, inspired by organic forms, is work of husband and wife Jim Holmes and Deborah Doane.

Gold necklace by Jeff and Susan Wise is set with various stones.

Bold, vivid patterns enliven handwoven rug by John Gunther.

Patchwork tapestry hat was created by textile artists Maribeth Graves and Betsy Giberson, aka Joppa Designs.

Ceramic pots by Emily Rossheim are noted for texture and color.

Akira and Larry Blount stitch up an array of winsome dolls.

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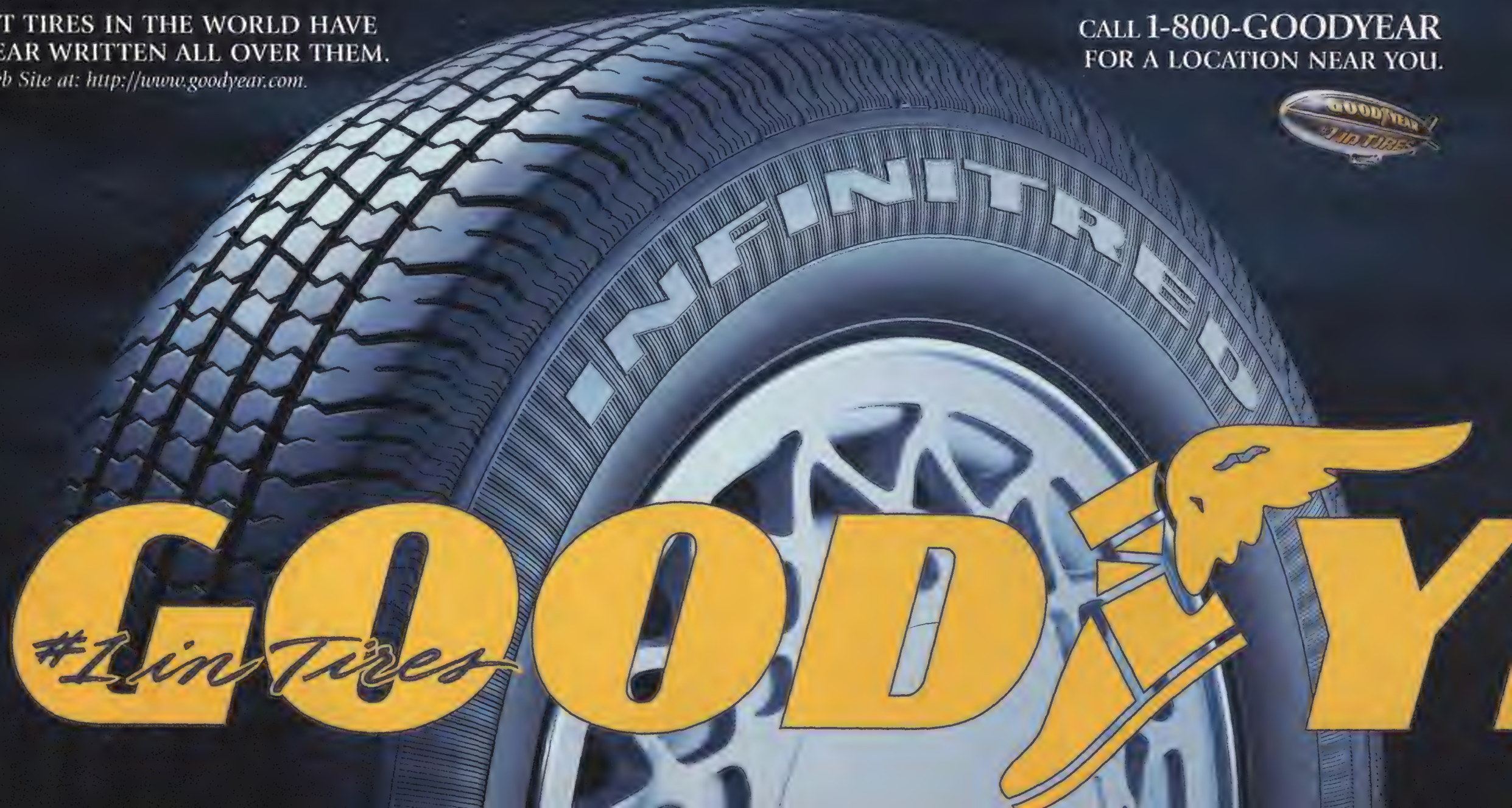

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By Timothy Foote

1846 The way we were– and the way we went

Expansionist spirit of 1846 later led to a high-flown vision of America's transcontinental progress.

The year the Smithsonian was born, America picked up a million square miles of real estate and our westward destiny was highly manifest

It was a year when people were reading "The Raven" by a neurotic genius who had flunked out of West Point. It was the year when Melville scored a hit with *Typee*, his first South Seas adventure; five years later *Moby-Dick* stirred hardly a ripple. The first game of baseball (*not* invented by Abner Doubleday) was played with present-day rules. Walt Whitman, age 26, landed a job as editor of the *Brooklyn Eagle*. In Manhattan P. T. Barnum, already rich and famous for "exhibiting all that is monstrous, scaley, strange and queer," was pleasing crowds with the latest of his Fat Boys.

It was a year when, at a great industrial fair in the nation's capital, inventor Elias Howe showed off his amazing new sewing machine. The first telegraph lines had been strung between Baltimore and Washington. During an operation at Massachusetts General Hospital in Boston a dentist named William Morton administered ether in the first public demonstration of its use as an anesthetic. Thereafter the help of three or four men need no longer be required to amputate a leg or pull a tooth.

It was a year when some 20,000 Mormons, savagely driven out of Nauvoo, Illinois, a city they built as a New Jerusalem, crossed the icy Mississippi to safety in Iowa. They were abolitionists who had lately begun to practice polygamy; their prophet, Joseph Smith, and his brother had been taken from jail and murdered. Now, under Brigham Young, they were on the point of heading farther west, not seeking any green and desirable place (where Young figured they would be attacked again) but some site where, with discipline and the help of the Almighty, they aimed to make the desert bloom.

To the south, in Independence, Missouri, several thousand emigrants, westward bound out of the United States for the Oregon territory and for California, then part of Mexico, were about to set off toward Fort Laramie and the Platte River, an early stop on what was to become famous as the Oregon Trail. Already at Laramie was an ambitious historian-to-be, 22-year-old Francis Parkman, Harvard '44, who intended to study Indians. He needed to know about them because he planned to write about the French and their Indian allies, but in his research back East the only Indians he could find were already completely corrupted by white civilization. The Indians around Fort Laramie turned up each day to cadge a handout of biscuits and coffee, and menace arriving wagon trains if the emigrants didn't give them richer fare. So Parkman was headed out to live in a remote Oglala Sioux village. The emigrants also disappointed him. They seemed to him "like a troop of schoolboys lost in the woods."

Also heading west was young Charles Stanton, who was exhilarated after crossing the Continental Divide at South Pass. "I have seen the Rocky Mountains," he wrote his brother, "and am now on the waters that flow to the Pacific! It seems as if I had left the old world behind and

For settlers emigrating west out of the United States, St. Louis, Missouri, was a stop en route to Independence.

In 1846, when this picture was painted, many travelers made their way this far aboard side-wheel steamboats.

a new one is dawning upon me." Stanton was traveling with the Donner Party. On December 21—snow-blind, frozen, starving and alone—he died after trying to help others make it over the last few agonizing miles of the Sierra Nevada and down into sunny California.

The year, of course, was 1846. We are just now commemorating it hereabouts as the Smithsonian Institution celebrates its 150th birthday, complete with a traveling show and a special exhibit at the National Portrait Gallery. Quite apart from the Smithsonian's founding, 1846 was an astonishing year. It was the year the Mexican War began. The year when the country, taking a quantum leap forward, suddenly completed the westward course of empire that Jefferson had dreamed of when he sent Lewis and Clark out exploring 40 years before. As 1846 began, the Union occupied less than half of what is the continental United States today; when it was over we possessed, or were soon to possess, all of it.

This was accomplished by means that are controversial to this day—the canny use of cash, diplomatic dealmaking, the threat of war and, finally, when the others failed, war itself. The war left us with 13,000 American dead—only 1,721 died in battle, most of the rest from disease. President James Polk's policies changed the contour of the country by adding more than a million square miles of territory. Some claimed they changed the content of our national character—and for the worse.

On May 3, 1846, down in steamy Fort Brown (now Brownsville, Texas), Ulysses S. Grant, a 24-year-old second lieutenant, heard enemy gunfire for the first time. The war he was about to fight, Grant figured (incorrectly, it turned out), would encourage the spread of slavery, and he wrote home, "I felt sorry that I had enlisted." In July, to protest that same war, Henry David Thoreau refused to pay his Concord, Massachusetts, poll tax. Characteristically, his aunt paid it for him, so after a night in jail he repaired to a nearby small lake to contemplate further civil disobedience and the changing seasons.

The author, on the Board of Editors, recently wrote about D-Day and the Irish "Troubles" of 1916-22.

The war added place-names like Buena Vista and Chapultepec to the American vocabulary. It brought to the fore two generals. Zachary Taylor, fondly known to his men as "Old Rough and Ready," dressed like a tramp, believed in the bayonet but fortunately had light artillery. In 1848 he would parlay his fighting fame into the Presidency. Towering Winfield Scott, unfondly known as "Old Fuss and Feathers," for years unsuccessfully aspired to the Presidency. But Scott won victories while keeping casualties to a minimum, and he ended the fighting in 1847 by jumping off across Mexico from the coast at Veracruz, driving toward Mexico City. His soldiers were always outnumbered, but they defeated Santa Anna again and again until the capital fell, in a campaign still admired by military tacticians.

Alexis de Tocqueville regarded America as one of the hopes of the world but nevertheless noted that Americans were "slaves of slogans." The slogan of choice in 1846 was "Manifest Destiny." The term had been coined in 1845 by a New York publisher named John O'Sullivan, eager to encourage, or get out ahead of, the curve of national expansion. It has drawn much scorn of late. In the 19th century, belief in Manifest Destiny would lead to some deplorable policies and even more deplorable rhetoric. But at first it simply meant that Providence had a universal design for Americans to carry their democratic machinery and customs across the continent.

In 1846, the man who more than any other set all this in motion was James K. Polk. A Scotch-Irish lawyer from Tennessee, Polk was a dyed-in-the-wool Democrat, a Presbyterian and a compulsive political micromanager. Though he had served five years as Speaker of the House (then made up of only 228 Congressmen) he was so little known to the voting public that when the Democratic convention at Baltimore finally chose him on the ninth ballot in 1844, the rival Whig Party jeered happily, "Who is James K. Polk?"

When the jeering stopped, he was the 11th President of the United States, with 170 electoral votes to famous Henry Clay's 105, though there was only a 38,000-popular-vote difference between them. Polk worked a 10- to 12-hour day, kept a diary of everything that he did or said (it ran to 25 handwritten volumes), complained bitterly about how hard the job was, but quickly set about becoming the first President to keep all his promises. He said he would serve only one term. He said he would fix up the federal treasury. He said he would adjust customs duties—in an era when Southern states sometimes threatened secession over tariffs. He said he would acquire Oregon ("54-40 or fight!"), a huge, disputed territory claimed by both Great Britain and the United States since the joint-occupancy treaty of 1827. He said he would annex the Republic of Texas. He said he would acquire California. He did all that and more.

Oregon was simple. All he had to do was to make it seem as if Americans were willing to risk war over it, discover that the British weren't, outbluff the British a time or two, and get a touchy Congress to pass an aggressive bill abrogating the 1827 treaty. In the end Polk had to settle for everything south of the 49th parallel—which meant that he got part of Idaho and all of what are now the states of Washington and Oregon.

Texas and California launched him into the sort of high-stakes, peace-or-war diplomatic maneuvering that Americans like to think only Bismarck and the British foreign office were good at. California still belonged to Mexico; only ten years earlier Texas had won its independence by defeating strongman Santa Anna's forces at San Jacinto. Sporadically raided and threatened with war by Mexico, the breakaway Texas Republic was kept out of the Union because adding a slave state would disturb the uneasy political balance in the U.S. Senate. But before Polk's Inauguration, through an initiative taken by Polk's predecessor, John Tyler, Congress admitted Texas as the 28th state—with Wisconsin shortly added to balance. Overnight, the border dispute between Texas and Mexico became a problem for the United States.

Polk opened talks with Mexico to clear things up—as well as settle long-outstanding money claims on Mexico

Democrat James K. Polk, elected in 1844, served only one term but accomplished all he had set out to do.

by U.S. citizens. He named John Slidell, a Louisiana trader, as special minister plenipotentiary authorized to offer Mexico $25 million for California and $5 million for New Mexico. Both Texas and the U.S. Government now claimed the Rio Grande as the western Texas-Mexico border. Mexico bitterly insisted the border was the Nueces River, 120 miles to the east (see map, page 46). Polk quietly moved 2,000 men under veteran Indian fighter Zachary Taylor toward the Nueces. The Mexican government kept Slidell (and Polk) waiting for weeks, then refused to receive Slidell, at least as minister plenipotentiary. By April, Taylor's army, considerably reinforced, had been moved on down to the mouth of the Rio Grande—either the southern tip of Texas or well inside Mexican territory—whichever way you saw it, a provocative move. Mexico saw it as invasion and again threatened war, this time with the United States.

Not only threatened. On April 25 a Mexican army crossed the Rio Grande with a view to cutting off Taylor's forces. It met with a startled American patrol, killed 11 troops, wounded 5 and took 47 prisoner. Stirred to action and outnumbered nearly two to one, Taylor's little army won two quick battles, then crossed the river, took the Mexican town of Matamoros and set up headquarters there. Taylor's dispatches did not reach Polk until May 8. On May 13, the President, declaring that Mexico had "shed American blood upon the American soil," signed a joint resolution stating that war had begun.

Polk was not a man to leave things to chance. When the unstable Mexican government was slow to come to terms, he got involved in a secret plot to bring the exiled leader Santa Anna to power—in return for a quick peace. Santa Anna double-crossed him. But Polk's aim had always been bloodless conquest. Whatever happened below the Rio Grande, he figured to stir up local revolutions in other restless Mexican territories. Weeks before the war, he had sent representatives to Santa Fe, in the huge Mexican province of New Mexico, to bribe its governor and to promise (correctly) that conditions would dramatically improve should revolution or a U.S. takeover occur. Now he ordered Gen. Stephen Kearny at Fort Leavenworth, Kansas, to take a force of dragoons to Santa Fe. For years, far more American than Mexican goods had been offered for sale in Sante Fe, so Kearny reached New Mexico closely followed by a traders' wagon train. On August 18 he took the capital of New Mexico without spilling any blood.

California was, as it usually is, a whole story in itself. In 1846 it was a sleepy province of Mexico, almost empty and dramatically ill-governed to the extent it was governed at all. The most remote and underpopulated part of the collapsed Spanish empire, it ran itself without much help from distant, usually bankrupt and chaotic Mexico City. From time to time one genial California general would snatch power from a rival in a bloodless coup, which, as an observer reported, mostly meant "that the revenue [had] fallen into other hands." The total California population ran to about 6,000 Mexicans

Fort Laramie, in what is now Wyoming, was a major stop on the Oregon Trail. Once a trading center for trappers and Indians, it became an Army post and a refuge for settlers heading up the Platte.

John Mix Stanley's *Buffalo Hunt on the Southwestern Prairies* was painted in 1845. Then, and for some years to come, artists often depicted the Plains Indians as great hunters and superb horsemen.

in addition to the local Indians, often reduced to devout near-servitude on behalf of religious missions. The land was controlled by Mexican cattle ranchers. There were some 800 ragtag Americans, most having come by ship around Cape Horn to trade for hides.

Polk being Polk, his cash offer to Mexico for California was not his only ploy. Early on he had sent secret orders to Commodore John Sloat, commander of our Pacific naval squadron, and to Thomas Larkin, a trader who served as U.S. consul in California. If war came, or if the British Navy made any move, Sloat was to occupy all California ports. Larkin was to cultivate his contacts with the lax local authorities and encourage any move on their part to declare independence from Mexico City. Mostly he was to impress on them not to accept the protection of any foreign power except the United States.

Polk's third secret message may have included orders to flamboyant John C. Frémont, at 33 a famous writer-explorer. Frémont always claimed it did, as did his father-in-law, Thomas Hart Benton, a powerful Senator from Missouri, and of course Frémont's wife, Jessie, whose editing of her husband's exploring accounts gave them much of their charm and readability. In any case, on the 9th of May, 1846, a messenger from the nation's capital, Marine Lieut. Archibald Gillespie, caught up with Frémont near Klamath Lake in Oregon. Frémont was bound east from his fourth mountain exploration. Whether from ambition or acting under orders, he abruptly turned back toward California, where he soon was fomenting revolution. He had raised a band of roughnecks. Creating a theatrical distraction, they captured the "microscopic hamlet" of Sonoma (it "could have been captured by Tom Sawyer and Huck Finn," says historian Bernard DeVoto) and, running a flag with a lumpily painted bear on it up the pole there, declared California an independent republic.

Frémont got himself made acting governor. In fairly short order, California was under the control of the United States of America. The fact was confirmed by the Treaty of Guadalupe Hidalgo, under the terms of which America got not only California but the land that today is Arizona, New Mexico, Nevada and Utah, as well as chunks of Colorado and Wyoming. Mexico got $15 million.

It is the custom now for Americans to judge the American past harshly and with a really notable lack of understanding, as if the people who lived then were exactly like us. But even the passionate abolitionists, pure spirits, and New England Whig politicians who bitterly condemned the Mexican War at the time, could not have imagined a country like our own, deeply concerned with the condition of its minorities, a country rich and secure enough even to debate whether wolves should be reintroduced into Yellowstone Park. The America of 1846 was nothing like that.

In that year the nation consisted of an uneasy union of 28 still very sovereign states. It had a population, including Indians and slaves, of less than 20 million, about as many people as live in New York State today. Its

western border ran roughly on a north-south line from Wisconsin to Louisiana. Beyond that lay what maps referred to as the "Great American Desert."

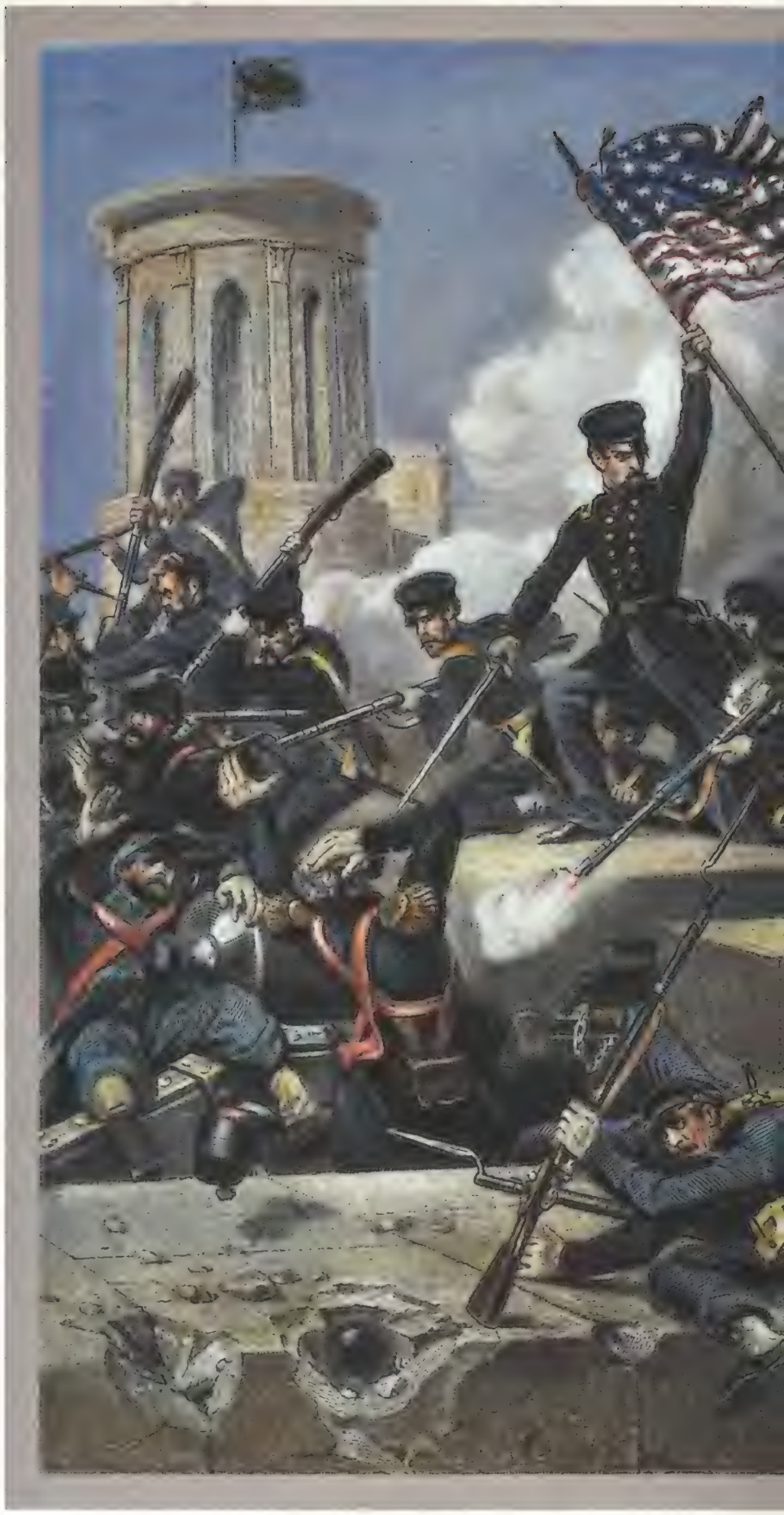
Americans were not much given to the kind of self-criticism we now practice. Or to criticism of any kind. Chest thumping was more our collective style. We were already noted for being miffed by critiques from Europeans who were always coming over to tell us how rude, violent, greedy and tasteless we were, as well as ragging us for spitting tobacco juice on the carpet, keeping slaves and terminating Indians with extreme prejudice.

All that was more or less true, of course, but, according to the prevailing American view, beside the point. In 1846 Eastern and Midwestern Indians had been crushed or brushed aside with treaties, for the time being. They were treated deceitfully by the government and would be treated worse as the century wore on. But in the struggle, they had done things to settlers that were not forgiven or forgotten. This was especially the case with people who already regarded them as savages and had little reason not to regard them as entirely inimical to the creation of towns, schools, railroads and real estate deals, which then, as now, passed for the spread of civilization. Slavery was seen as a problem and, by some, as a sin, but we had tried to contain its divisive thrust with the Compromise of 1820: no slave states north of 36 degrees 30 minutes north latitude. If we kept expanding westward, we might keep it from splitting the Union for a while, and perhaps it would wither away.

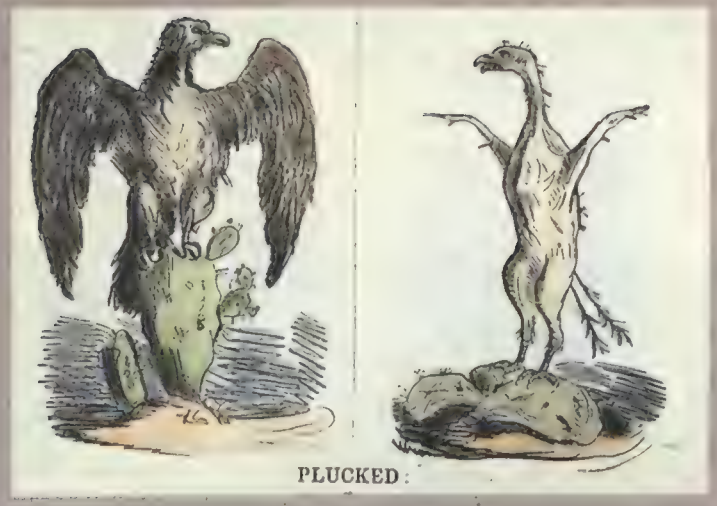
The franchise was steadily expanding

In 1844, the antislavery candidate got just 62,000 votes; it was only in 1845 that Congress lifted a decade-long ban on debating slavery issues in the House. In 1848, the Free-Soil Party polled just 290,000. If women didn't vote, well, they didn't vote anywhere else either, did they? Europe, after all, was a place we'd broken away from by force of arms, a place governed by tyrants and frozen into rigid social classes. Meanwhile, over here, the franchise was steadily expanding. Almost anyone could walk into the White House and see the President. In 1846, America was the only place in the world where the people got to elect their head of state.

The country was not yet embarrassed by patriotism. Settlers rolling west in covered wagons read the Declaration of Independence aloud to each other on the Fourth of July. Americans were deeply religious. They had no trouble believing that God had created the world in all its infinite variety (Charles Darwin's findings on evolution were 13 years away) or that Providence was watching over America, the greatest experiment in freedom and democracy ever. It followed (and was mostly true) that any place annexed by America was likely to be better off than it had been before.



By dog-eared tradition America's remarkable growth and prosperity depended on private liberty, more of it than any stable political system had tried before, and public land, more of it tillable and easily acquired than history had yet seen. Because of it there was no income tax; the federal government and those of many states ran mainly on the sale of public land. (Frugally, of course—Polk had only one private secretary to help him with his paperwork.) Land policy varied. Real estate scams abounded. But generally the old cliché of the American Frontier did apply: a family with grit could move west, carve a life out of the wilderness, squat there



The storming of the parapets of Chapultepec castle by Winfield Scott's army in September 1847 brought an end to fighting in the Mexican War—and later resulted in a cartoon showing Mexico in defeat. Gen. Zachary Taylor (below) won the Presidency in 1848 on his war record.

and have a good chance of buying the place, sometimes for as little as $1.25 an acre.

Because of land the immigrants came. Starting in 1846 the latest wave, more than a million, were refugees from Ireland's potato blights and killing famine. At first they did not go to the frontier; the only farming they knew was the cultivation of an acre or two of potatoes. Instead, they huddled in the seaboard cities and soon were dying by the thousands of cholera. They displaced free people of color as servants to the rich and slowed incipient attempts to organize labor by their need to work at almost any wage. Most were Catholic and many spoke only Gaelic, and they sometimes found themselves treated as half-human. Thousands volunteered for the war (monthly pay $7). Of these enough deserted to the Mexican side to form the "San Patricio" battalion. The Mexicans promised 320 acres of free land and did not fail to point out that fellow Catholics should not be fighting alongside black-hearted Protestant gringos.

Zachary Taylor's volunteer soldiers struggling into Mexico and the hundreds of wagons creaking and bumping westward in the summer of 1846 were the vanguard and living proof that the idea of Manifest Destiny had taken root. New England Whigs lambasted the Mexican War as a betrayal of American ideals. A fair number of people today can hardly mention it without wincing as if for the transgression of a shady relative. But in the South and West it set off a blaze of patriotic feeling. Though the peace treaty was slow to be signed, we had whipped the Mexican Army. Settlers were about to take on the Great American Desert.

A vast expanse, savage and forbidding

Entering it, you were emigrating outside the United States. Back East, people knew very little about it except that it was forbidding. A vast expanse of plains with Indians. Sometimes mountainous and hard to cross—like the Rockies and the Sierra Nevada. Sometimes flat, baking hot and waterless. Even the treeless, near-to-hand prairies, which eventually became the breadbasket of the nation, were little known. Westering settlers thus far had been used to cutting farms out of forest, braving Indians, running a few pigs as livestock. They figured that any place where trees did not grow wouldn't be much for growing anything else. Besides, without trees, how could you build a cabin?

It would be two decades before a rush of homesteaders settled these prairies and got used to grim sod huts and great corn crops. But in the early 1840s a few thousand farmers and homesteaders dared to try the grueling five-month trek across the often deadly 2,000 miles or so that lay between Independence, Missouri, and the alluring green of Oregon's Willamette Valley. In 1846, of some 2,700 people gathered for westward migration at Independence, more than 1,200 were aiming for California. They were the real start of a rush there that ran wild in 1849 after gold was found.

The allure of the place that year can largely be blamed on a best-selling new book by an unscrupulous real estate promoter named Lansford W. Hastings. Its title: *The Emigrant's Guide to Oregon and California.* Hastings, who had interests there, was high on California, a place of "perpetual spring," he wrote, where no "noxious miasmatic effluvia" existed. Oats grew eight feet tall and wheat yielded 70 bushels per acre—sometimes 120. Hastings' clincher for householders wheezing and

Map shows the United States in 1846—roughly the somewhat-settled eastern area—and vast lands acquired by war and Polk's diplomacy. Trails to Oregon, Utah and California all crossed the Rockies at South Pass.

freezing back East during the cold winter of 1845: in California you never had to build a fire, except to cook.

The trek continued for nearly 20 years. It became one of the set pieces of American history. The routes to Oregon and California were the same at first: up the south fork of the Platte River, over South Pass (at 7,500 feet) in what is now Wyoming, north past Soda Springs in Idaho, then down the Snake River. Those California bound turned south beyond the Great Salt Lake to follow the Humboldt River to the Sierra Nevada and Sacramento. The way west could be a great adventure. As the Donner Party proved, it could also be a season in hell. In any case it was a challenge taken mainly by people of substance. George Donner, leader of the ill-fated Donner Party, was rich; his wife was going to start a genteel girls' school in California. Fellow travelers came from all sorts of trades and professions, some scribbling poetry or collecting scientific specimens along the way.

It took considerable substance to get together the supplies thought necessary for a family of four, including: a covered wagon that could run you $200 even if you bought the cover in Missouri to save money; four yoke of oxen (more durable than horses and less often stolen by Indians) at $20 to $30 per yoke; for each male traveler a rifle, a shotgun and maybe one of Samuel Colt's new single-action revolvers (about $50); 200 lbs. flour; 75 lbs. bacon; 300 lbs. "pilot" bread, or hardtack; 10 lbs. salt; 20 lbs. sugar; 5 lbs. coffee; 2 lbs. tea; 25 lbs. rice, and a small keg of vinegar. At a rough total, from $700 to $1,500. Many people sold off all their land and livestock to get the cash.

Between 1845 and 1859 some 280,000 souls took the Oregon Trail; an estimated 30,000 died along the way. Many were babies and toddlers who, on the trail or off it, in the America of 1846 often did not live past age 5. Dysentery, fever, almost any sort of infection, swept them away. Cholera became a notable killer; settlers, not expecting to pass that way again, were slapdash about latrines and garbage, and those following them suffered. Women died in childbirth. But generally people were killed by carelessness; children fell out of wagons and were run over; guns went off accidentally, though some wagon trains required that most guns be kept unloaded during the day's run. The dead were carried along till evening, then buried. Next day all the wagons would roll over the grave to obliterate it and pack it down as a

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Depicted by a painter who was with them, Mormons cross the iced-over Mississippi after being driven from Nauvoo, Illinois. Some 20,000 wintered at Council Bluffs in Iowa Territory before making the long trek to Utah.

protection from marauding varmints. Until the 1860s, contrary to the impression given by the movies, Western Indians rarely killed migrating settlers along the trail, though they stole horses, shot poison arrows at oxen and sometimes fired on passing wagons.

Francis Parkman's famous *Oregon Trail* is sharper about Indians than about wagon trains. Because he was in search of groups uncorrupted by whites, stayed in the village of a notable Sioux warrior chief, and much admired his host's skill and bravery, he makes an interesting witness. Modern scholars note that Parkman was not a trained cultural anthropologist and was thus incapable, as one told me, "of recognizing differences in honorable cultures." Yet it is hard not to believe his low-key reporting when he watches a young woman catch, kill and skin a family puppy for a feast, adding that he himself later bought a white dog that had growled at him and had it cooked at an obligatory party for his host. The Sioux, he notes, will "sometimes give away the whole of their possessions." But they also routinely stole wives and ponies from each other and sometimes tortured captured enemies. What strikes Parkman as most troubling, though, is that the Sioux he knows are capricious in the extreme; honorable, perhaps, but not easy to integrate into busy, greedy 19th-century society.

Crossing the plains, wood soon ran out; wagon-train women gingerly learned to use buffalo chips (known as *bois de vache*) for cooking. The stuff burned better than cottonwood. The travelers scratched brief messages for others coming behind, using cattle skulls and bones that gradually accumulated along the way. Those who too flagrantly broke the wagon-train rules were hanged from an upright wagon tongue (which must have been remarkably awkward) or were driven from the group to travel on alone. This happened to the Donner Party's James Frazier Reed after he killed a man in self-defense. As a result of his exile, he survived and heroically helped lead repeated rescue parties, the first of which found his 9-year-old daughter, Patty, barely alive in a snow-covered hut in February 1847.

Even in the best of times, except in highly disciplined groups—commercial traders, say, or the Mormons—progress was nothing like the orderly procession of white-topped prairie schooners, routinely circling for protection each night, that Hollywood has made part of American culture (along with stagy Indians in bad make-up who keep attacking and being shot down in droves). There were practical procedures about assignment of

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Explorer and author John C. Frémont, briefly governor of California, lost race for the Presidency in 1856.

duties and places in line for the daily march, but the American penchant for exercising personal freedom at all costs caused all sorts of trouble. A "captain who wanted to camp here rather than there," Bernard DeVoto writes, "had to make his point by parliamentary procedure and the art of oratory. It remained the precious right of a free American . . . to camp somewhere else at his whim or pleasure." Or not stay in line. Strung out along the trail at "senseless intervals they traveled fewer miles a day than they might have, traveled them with greater difficulty than they needed to." They were ready enough to help one another through any emergency or difficulty, DeVoto concludes, but "were unwilling to discipline themselves to an orderly and sensible routine."

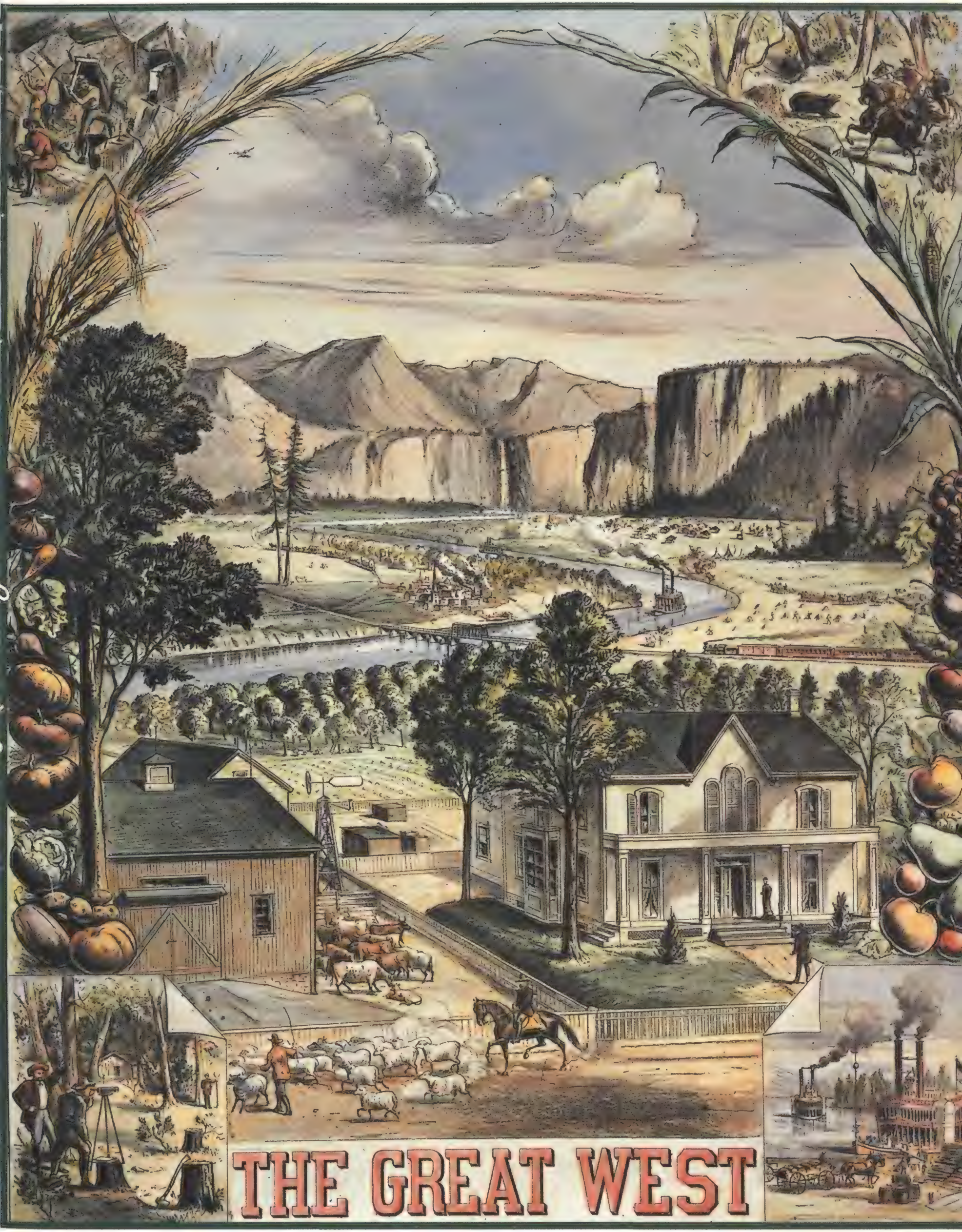
He is not here particularly describing the Donner Party. It came to almost unimaginable grief for reasons that discipline and common sense might not have avoided. The group tried a shortcut urged on them personally by Lansford Hastings: south of the Great Salt Lake, then across the salt flats, which even today drivers in air-conditioned cars are advised not to enter casually. That took weeks. Even so, they might not have become a grisly chapter in frontier history if in 1846 blizzards had not started a month early in the Sierra Nevada, burying the passes in 30 feet of snow. History has concentrated on cannibalism, but the group produced some heroes whose self-sacrifice is almost beyond praise. To read about them is to weep for us all. DeVoto is probably right, though, that the significance of the Donner experience is as a reminder of dangers that any wagon train might face if things went really wrong.

Critics of Polk and the Mexican War attacked the President with self-righteous passion and some Whiggish hypocrisy for nudging the country from domestic innocence to incipient imperialism. But it was, and is, hard for most Americans to believe it would have been better for the United States and the world if Mexico or some other country (Britain? Spain?) controlled much of what we now call our own. In 1846 even the most violent abolitionists hadn't a clue about how to free—or later deal with—some three million slaves. War was, in fact, the only way to abolish slavery in the United States. But like most people confronted by an unsolvable and shameful problem—and by such a destructive alternative—Americans generally tried not to face it, hoping it would go away. With all that new land, most of it not suitable for slave-worked crops, might not the tension ease? Instead Southerners and States Righters grew more desperate about their share of power and more politically aggressive, especially after an attempt in Congress to link the peace treaty to an agreement that no part of the land acquired from Mexico would permit slavery. Meanwhile the power of the abolitionists—who, as late as 1844, were widely regarded as politically insignificant and a bit nutty—increased. And, with a little help from the speeches of Daniel Webster, so did the cult of the quasi-sacred Union—to be preserved at all costs. The federal government, of course, had just got considerable practice in mobilizing for modern war.

James K. Polk did not live to see what happened. He died, exhausted, three months after the end of his term. Ambitious John C. Frémont lived to take part in it, ineffectively. In 1856 he became the first candidate for President put up by the new Republican Party—and lost. Four years later the Republican candidate was Abraham Lincoln. After the people of the Thirteen Colonies had won their freedom, and the French had disposed of their monarchy, British statesman Edmund Burke had this to say: "The effect of liberty to individuals is, that they may do as they please: We ought to see what it will please them to do, before we risque congratulations."

In June 1846, George Pickett of Richmond, Virginia, graduated from West Point last in a class of 59. For him the road to Gettysburg led through Chapultepec.

An 1881 travel poster sums up the unspoiled charm of Western lands, and the middle-class fate awaiting them.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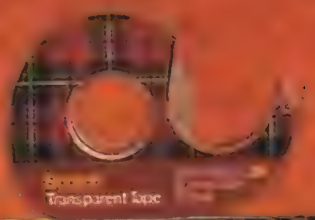
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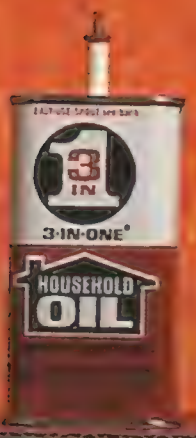
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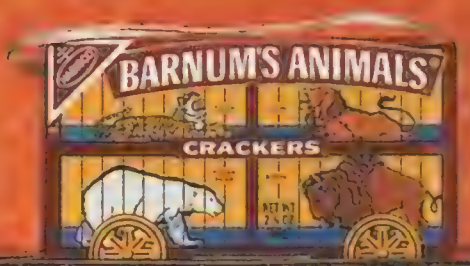
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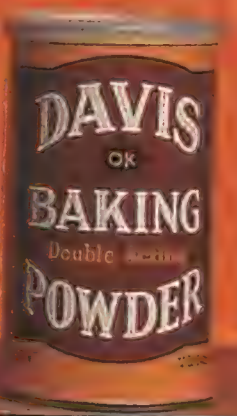
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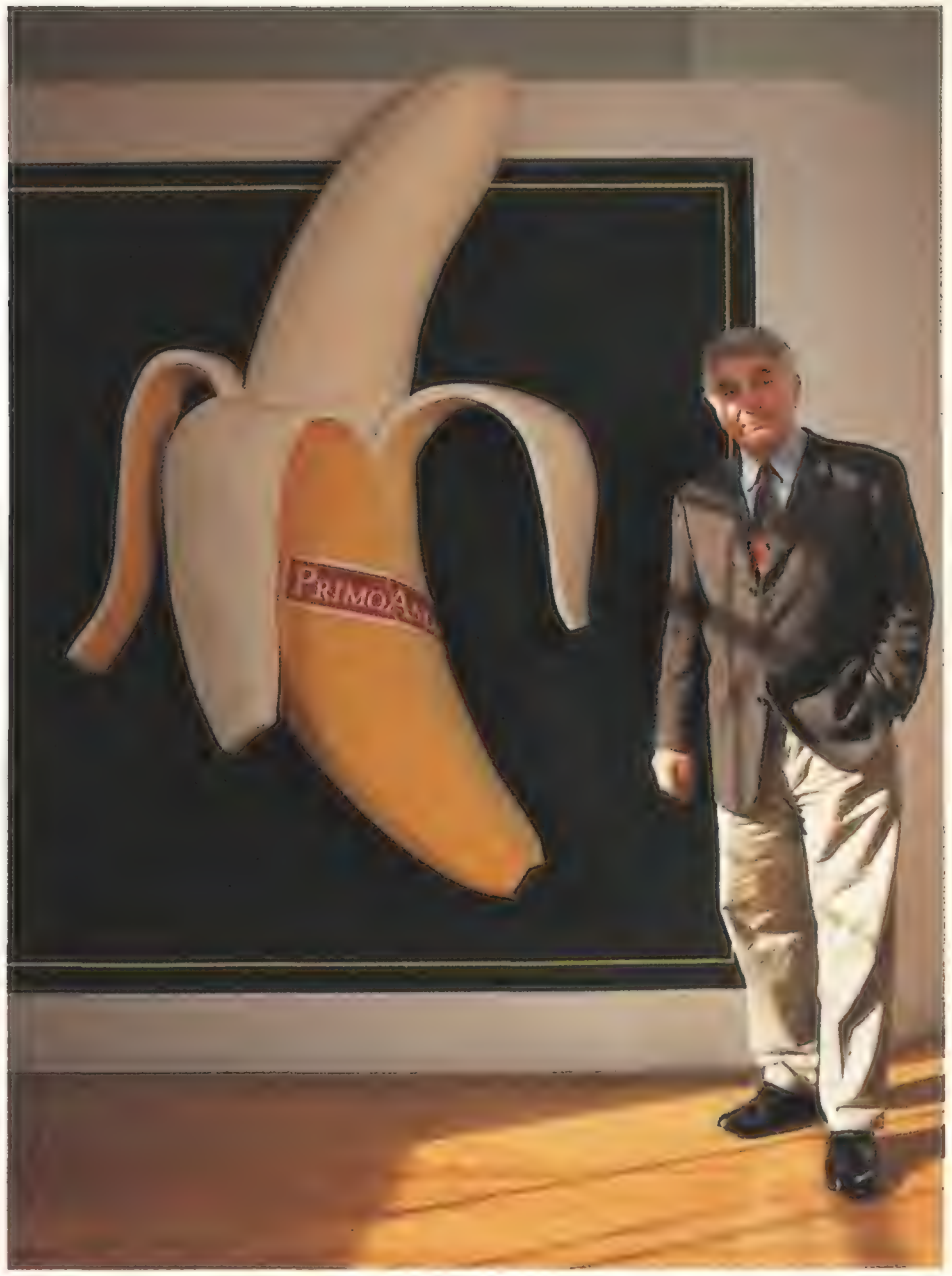
Package design: the art of selling, all wrapped up

When competition for customers' attention gets ferocious, that bottle, carton or can is a lot more than just another pretty face



In his studio Primo Angeli displays "the perfect package"—a design he wishes he could call his own.

Primo Angeli's studio, on the second floor of a renovated Victorian in a vaguely fashionable district of San Francisco, has the look of a Pop Art prank. A five-foot Styrofoam banana leers down from a mural in a state of provocative unpeel. Ten vintage jukeboxes stand guard in a Technicolor blaze. And the pièce de résistance: a watermelon-size hunk of granite teetering on a tripod of 132 stale doughnuts. I ponder the specific gravity of granite and wonder how the doughnuts bear up. Angeli explains: the rock is not granite but papier-mâché.

I am not entirely surprised. Like so many things in this place, the doughnut tower is mostly metaphor, not so much a work of art as the idea of one. Angeli, a generously built man with the shaggy good looks of an Italian film star, is the metaphor maker. On the walls behind us are samples of his creations and those of his staff of 32—row upon row of mostly empty boxes, bottles, cartons and tins. Angeli reaches up to select a piece. His fingers close around an amber bottle, and his smile deepens as he leads me to a table in the adjoining conference room. He puts the bottle on the table, then pads off on sneakered feet to gather glasses and ice.

"I know you want root beer," he says.

You bet I do. After half an hour of browsing through Angeli's package designs, I lust after not only root beer but flavored coffees, iced biscotti, Belgian chocolates, sourdough bread and, most surprisingly, given that I can't abide the taste of beer, Australian ale. Angeli pours the root beer. It's unexceptional—sweet, without the requisite kick of serious root beer. But the bottle looms elegant beside us, lovely, almost antique. Classy stuff. Slowly, my resolve weakens. What do I really know about root beer, anyway? Who am I to judge? I realize with a start that I'm conducting an internal dialogue with a bottle of soda pop; I not only want to like this root beer, I want the root beer to like me.

"There is a relationship between consumers and packages, a psychodrama, really," Angeli declares, cradling his glass.

No kidding.

Packages are sometimes called "silent salesmen," but what they really do is seduce. They transform ordinary things—like soap or hair spray or baby powder or muffin mix—into objects of desire. They make us hungry for things we don't need, even for things we don't want. In the eight seconds or so that it takes to choose a laundry detergent or frozen pizza, the package must scream or whine or purr or whisper its message of good taste or

Tried and true: some time-tested packages are so familiar you can recognize them from a block away.

Photographs by Brooks Walker

cheapness or strength or luxury loud and clear enough to grab our interest. No wonder, then, that designing, producing and marketing packages has grown into such an enterprise, a business of equal parts art and artifice, science and deception.

"The identity of a product grows out of its external covering, its shell," says Ellen Lupton, curator of contemporary design at the Smithsonian's Cooper-Hewitt, National Design Museum in New York. Indeed, many competing products are similar—aspirin, for example, is aspirin is aspirin. What draws us to some over others is the message that they're wrapped in. As Stewart Ewen, professor of media studies at Hunter College, puts it, packaging is the triumph of the superficial.

To truly grasp the impact of packaging, one might first consider a world without it. Imagine, for instance, a substance in a clear plastic bag bearing a simple label with its list of ingredients and the words "Chocolate Cake Mix." Imagine this sad heap slumping on the grocer's shelf in a funk of brown powder, devoid of its promise to bloom into a showy dessert. How many of us would choose to pick up, let alone buy, this pile of dust? Now, think of an entire supermarket filled with similar items: toothpaste in sterile white tubes, shampoo in thick plastic bottles, breakfast cereal in wax paper sacks stapled or bound with string. The goods in this store may be equal to or even better than goods elsewhere, the prices competitive, the sales clerks sharp. Yet, its success among retailers today would be, at best, unlikely.

Gail Davidson, assistant curator of drawings and prints at the National Design Museum, describes packaging as a key to consumer culture, a sort of Rosetta stone of values. Davidson shows me designs by early industrial luminaries Donald Deskey (packaging for laundry detergent, shampoo and toothpaste) and Henry Dreyfuss (labels for candy, ice cream and canned goods). Prewar designs were subtle compared with those from the late 1940s and the '50s, when Americans discovered the supermarket. For it was in the supermarket that the package came to reign supreme and, as Alvin E. Dodd, president of the American Management Association, wrote prophetically in 1936, "where a mighty little man of glass, or wood, or paper, or metal was ready to become their most vigilant salesman, a salesman who never fell down on the job—never took time out." If anything, Dodd underestimated the impact of packaging, writing as he did before the onslaught of plastics. Plastics, specifically polyethylene, changed the face of packaging dramatically, giving rise to objects nature never intended: seemingly indestructible, lightweight forms of every size, shape and color.

At Gerstman + Meyers in Manhattan, one of the country's largest package-design firms, materials specialist Rick Hirst designs in cardboard, glass and metal. But it is plastic that brings out the kid in him.

"You can do almost anything with plastic," he ex-

A new design for a 100-year-old-plus classic (left) keeps the barbell form and the logo. Tiffany's elegant package, in traditional blue, gives the contents cachet.

plains, tossing me a spaghetti sauce jar in the form of a football, and a salsa bottle built in steps, like a pyramid. "We want to bend the icons so that these containers stand out, but not so much that people can't figure out what's inside." Hmm . . . footballs and spaghetti sauce?

Hirst's boss, Herbert Meyers, a founding partner of Gerstman + Meyers, is a spare, modest man who favors starched white shirts, understated ties and getting to the point. Meyers got his start designing cardboard boxes, a skill he said has served him well.

"Packaging in the United States is a precise business," he says. "A mistake can be very, very costly." Richard Gerstman relates the saga of a cola manufacturer that decided to change its product without modifying its image. The "new, improved" (read "sweeter") cola did well in blind taste tests and was launched with royal fanfare. But consumers didn't buy it, largely, he said, because the can was virtually unchanged, generating taste expectations that the new soda didn't meet. Similar marketing nightmares led to what is called the "scientific approach" to package design.

Davis Masten, one of the principals of Cheskin + Masten/ImageNet, a market research firm near San Francisco, says that the challenge of packaging is to create an identity to which the buyer aspires, not to reflect the buyer's true identity. When Primo Angeli designed packaging for an Italian coffee imported to the United States, for instance, he didn't put frumpy-looking Americans in bathrobes on the label. True, Americans drink an awful lot of coffee in ratty bathrobes, but why rub it in? Angeli's label pictures an elegant and presumably Italian couple fully dressed in flowing white and sitting cheek to cheek in a romantic terra-cotta setting, totally engaged not in the funny pages but in each other. Likewise, almost tasteless beer sells in packages that reflect not what the buyer is (a drinker of meek beer) but what the buyer wants to be—reckless, youthful and too vigorous to be slowed down by a "heavy" brew.

"I've been involved in many studies in which the product will actually taste different because of the motivating force of the package," Masten says.

Brad Hammond, associate professor of industrial design at the University of Cincinnati and a packaging consultant, believes that "power packaging," a concept introduced in the early '80s, can motivate people to buy just about anything. For example, liquid laundry detergent was at first a hard sell, because consumers thought it was simply watered-down powder. But when manufacturers put it into an easy-pour container with a built-in spout and a cap that doubles as a measuring cup, the stuff flew off the shelves. That's because the package gave the product what business folk call "added value"—it seemed to lighten the load of laundry day.

Perhaps the ultimate in "power packaging" are the designs for plain water, as beautiful packages convince millions to pay for a product sometimes indistinguishable

Award-winning design for bottled water (above) led to soaring sales. Sapporo's beer "tumbler," now only for export, was for Japanese averse to drinking from cans.

Designer in his element: Marc Rosen's office is so adorned with *objets*, he works in his lap. His test-tube trio introduced men's toiletry products.

from what the rest of us get for free. This is not a new idea: indeed, the trick of wrapping goods in luxury packages to increase their apparent value dates back to ancient Egypt, where gold and jewel-encrusted perfume flacons were worth far more than what they contained. This practice is even more flagrant in today's cosmetic and perfume industry, where image is everything.

"Fragrances used to be all about sex and romance, but today they're about lifestyle," gushes package designer Marc Rosen, ushering me into what he calls his office, but I call a salon. He directs me to an 18th-century Irish Chippendale chair covered in faux leopard skin. Glass shelves hold his award-winning designs—giant perfume bottles inspired by the shape of test tubes, skyscrapers, Japanese-style fans and what Rosen says was an ancient Etruscan love knot.

"In the 1970s and '80s, the industry wanted bottles that conveyed sex and power; that's what that skyscraper is about," he notes. "But now it's all about escaping stress and feeling good about yourself." I understand "sexy and powerful," but it's hard to imagine a package conveying a "feel good" message. "Oh, it's not that difficult," Rosen insists. "For example, I just designed a fragrance line for men in the shape of beer bottles."

When I return to Gerstman + Meyers to see packaging in the making, design director Monica Kurkemelis is struggling to achieve what to me seems the impossible with a paper towel wrapper. A row of competing towels loom down from a shelf above her desk, their wrappers dripping with every imaginable superlative emblazoned in glaring pastels. The packages promise the roughest, toughest, most-absorbent lint-free paper towels on Earth. What more, I wonder, can one expect from a piece of puckered paper?

"This is a very busy category," Kurkemelis admits glumly. "It's really a matter of whose package screams the loudest." She explains that the dullest products, like laundry detergent, window cleaner, napkins and such, are usually put into the brashest wrappings. There is no way that the product can speak for itself (after all, what does a paper towel have to say?), so the package does the talking. Kurkemelis has already decided to reposition her paper towel with a single word: a word that, placed strategically under the product's name, will resound with undertones of quality. A dictionary, a thesaurus, four pizzas and a roomful of colleagues are called in to brainstorm, and an hour later some two hundred adjectives—from "silky" to "powerful"—lie scrawled across an artist's sketch pad. "One of these is bound to do it," Kurkemelis says, stumbling back to her cubicle. But none does. Four days later, she is still sweating it out at her computer.

Like most designers, Kurkemelis regards color as perhaps the most important element of a package. It is said

The author codirects the graduate program in science journalism at Boston University. She wrote about playgrounds in the July 1994 SMITHSONIAN.

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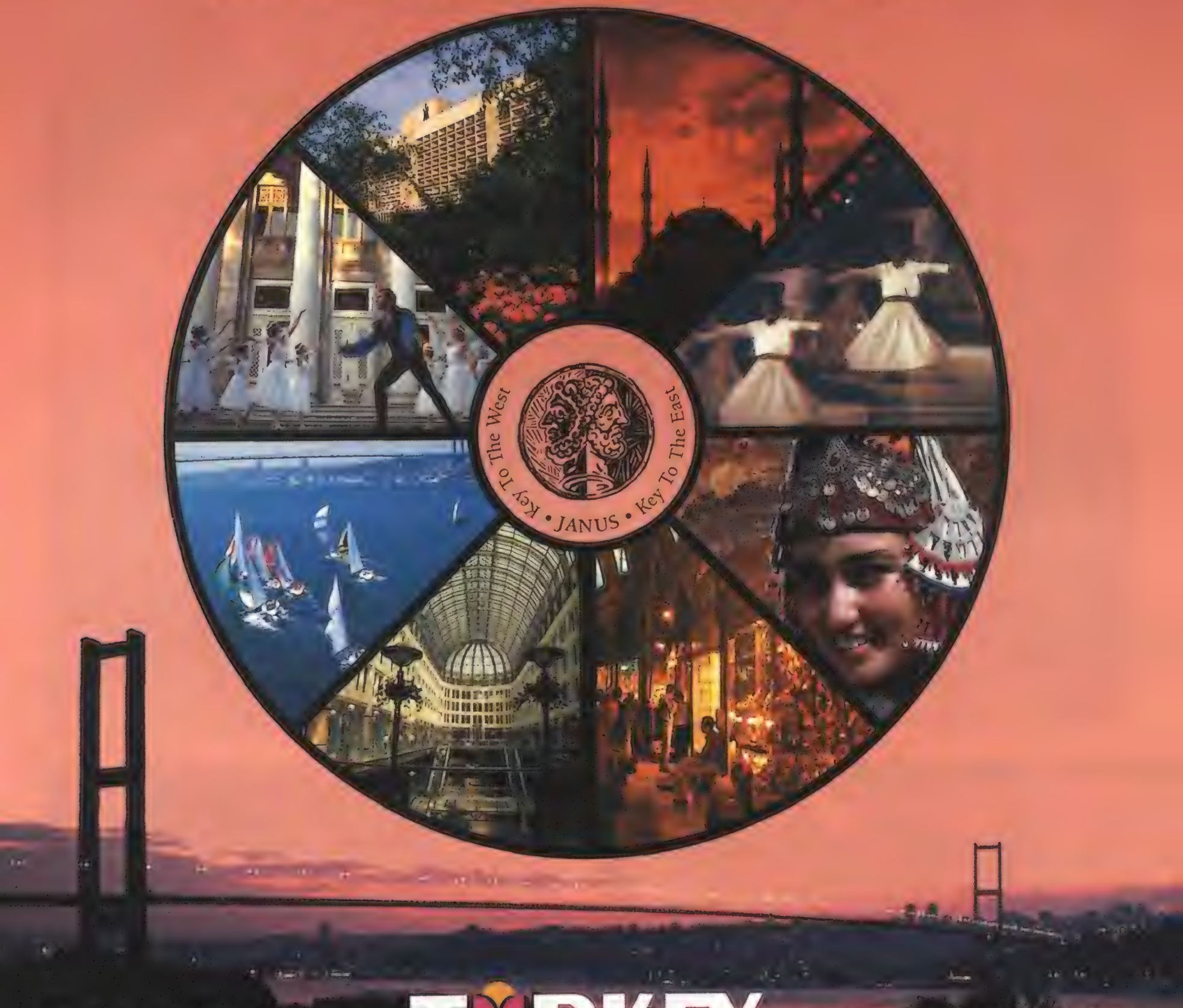

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that people react to color emotionally rather than intellectually, and that this gives color subliminal power. It's no secret that red is a standout, and mass marketers love it—everything from cereal to shaving cream to cola comes dressed in red. Blue, with its link to water, sky and royalty, can be either bold or soothing, depending on its tone, and for obvious reasons it is rarely used for food other than seafood. Yellow, when golden, connotes quality, but in its more garish shades evokes the cut-rate, not always an undesirable effect. (The price-conscious might reach for a yellow box assuming that it's cheaper.) Kids like primary colors, while the affluent—and those who aspire to affluence—often prefer muted earth tones and black.

But a quick rummage through one's cupboards reveals that these color "rules" were made to be broken: peanut butter decked out in blue or an expensive watch in a yellow box is not unheard of. On most levels, packaging reflects not psychological dogma but individual esthetics. It is a highly subjective business, a business that, no matter how "scientifically" conducted, comes down to storytelling. The story is meant to be unique and evocative, but it must also tap into what theorists call "stable data"; it must jibe with what people have come to believe about their world. In other words, no matter how practical or creative, a package can't be too oddball and sell.

For instance, in Europe tomato paste is sold in tubes, like toothpaste, a clever idea that allows small amounts of paste to be squeezed into a recipe. But when the tube was introduced in this country, it failed largely because most Americans do not associate metal tubes with things edible. The same goes for milk, tomatoes and other "fresh" foods packed in sterilized boxes, called "tetrabricks." Tetrabricks are a good idea—they keep food fresh for weeks, even months, and they are cheaper to make than freezer packaging. Europeans, with their small refrigerators, love them, but Americans, with our elephantine freezers, have the luxury of skepticism. No matter that vacuum-packed tomato sauce tastes better than canned; Americans simply won't buy it.

And even the most carefully crafted packaging esthetic is easily foiled by fickle consumers. The maker of a brand of high-priced ice cream, for example, thought fancy packaging would help sell its product. But it turned out the public wouldn't stand for individually wrapped bars lying side by side on a bed of plastic, because they thought they were paying extra for packaging. It was not until the plastic thrones were abandoned that the ice cream seemed really "worth" its price. Likewise, compact disks double-packaged in clear plastic "jewel boxes" and encased in cardboard "long boxes" got a thumbs down. Long boxes discouraged theft and allowed retailers to display CDs in the same bins used for vinyl records. But the obvious wastefulness of these packages spawned a "ban the box" movement resulting in the death of the long box and the rethinking of the jewel box.

Packaging design and its antithesis: stylish decanter (above) creates an upscale aura for gourmet oil and won a Clio award; bulk jugs in a health food store did not.

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A display of drawings and prototypes in the studio of Primo Angeli shows the many stages of bottle design. Now, 3-D images created with Computer Aided Design software are reducing the need for actual models.

"I love small packages, but the jewel box is no way to go about it," says Spencer Drate, a New York-based CD package designer-consultant. "It's just a hunk of cheap plastic. You can't emboss it, you can't die-cut it, it just sits there, doing nothing, until it breaks. We should offer consumers a keepsake, something that helps make a connection between them and the music."

Drate plows through his office, looking for examples of "keepsake" CD packaging. He pulls out elegant cardboard folders and books made of undyed papers, a miniature pizza box complete with grease stains, a pint-size rubber tire and a plastic sheath coated in Astroturf. Each holds one or more compact disks, but that, to me, seems beside the point. The packages themselves are amazing, and I want to take home every one of them.

The environmental concern that sparked the long box revolt was extreme but not unique. Demand to reduce package waste is growing, so much so that at the Art Center College of Design in Pasadena, California, the next generation of package designers is being schooled in what is essentially the art and science of *unpackaging*. Instructor Dan Hoy invites me to sit in on a session of Package Design I, where students are reinventing the box for Deja Shoe, a brand of footwear made of mostly recycled materials. Sketches are propped against the studio blackboard, along with concept prototype "shoe boxes" made of, among other things, an old blue jeans leg, a half-gallon plastic water jug sliced in half and lashed together with hemp (reusable as a planter), and a handcrafted (from an old inner tube) rubber string bag that doubles as a carrier for beach toys. The assignment is serious—to come up with practical ideas. But there are whimsical elements. A reused detergent box has images of throwaway soda can ring tabs. Another design calls for the shoes to lie in a bed of dryer lint instead of tissue paper.

"Packaging is a very small percentage of total waste, but it is a very visible one," says Art Center instructor Gloria Kondrup. "So, environmental criteria must be part of any design. Designing a package that no one throws out, that's the ultimate in sustainable design."

In the marketplace, though, environmental concerns almost always give way to convenience. Busy consumers demand ease of use, defined by getting shoes, food and everything else out of the package and into action as quickly as possible. Single-serving entrees and beverages, individually wrapped cheese slices and snack foods, and child-size portions of pudding for lunchboxes are becoming increasingly popular. Retailers, too, demand convenience to reduce labor costs. Thousands of products, from rubber bands to radios, are sold in blister packs, tight-fitting sandwiches of plastic and cardboard. Blister packs display products temptingly and prohibit touch. They also minimize theft: small items, such as lipsticks or pens, are hard to pocket when embalmed in plastic and stuck to a cardboard backing. But blister packs are often annoying to consumers. Children and some elderly persons can barely open them, and those who try risk slicing a finger on sharp plastic. And, once opened, blister packs become instant garbage. (In Germany, many stores that sell them keep a recycling barrel near the door, where customers dump the pack on their way out.)

"The blister pack was designed not for people, but for mass merchandising," says Prof. Herbert Tyrnauer, former chairman of the department of design at California

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The ultimate in design may be this toothbrush, stand and package, all done by European Phillipe Starck.

State University at Long Beach. "It helps wholesalers keep track of exactly how many units are shipped, and aids in inventory control, because you can hang them on pegs, in full view. Kids can see their Barbie doll through the plastic, but they can't open them. It's easy to see why retailers love blister packs . . . if you put that same Barbie doll in an easy-open reusable container, say a zip-lock bag, 5-year-olds would swamp the stores like lemmings, unzipping seven Barbies each and throwing parties."

Still, plastic packaging per se is not necessarily a bad thing. People wax nostalgic about reusable milk bottles delivered to their door. But glass bottles are breakable and heavy, and the chemicals used to sterilize them, such as sodium hydroxide, are caustic.

"The milk bottle was involved in an awful lot of lawsuits," says Daniel Goodwin, chairman of the department of packaging science at the Rochester Institute of Technology (RIT). "And the energy used to transport and wash refillable bottles rivals the amount required to make the plastic ones."

Goodwin takes me for a tour of his packaging laboratories, a sort of chamber of horrors for inanimate objects. We begin in a large, windowless room, where four blue 55-gallon barrels are strapped together, bumping and grinding on what appears to be an amusement park kidney cruncher but is actually a simulated truck bed. Dozens of products, from radiator coils to surgical instruments, have taken this ride. Some survived, others didn't, all depending on the package they came in. Today's load, tissue culture media (food for microorganisms grown in laboratories), is particularly sensitive—the tiniest fleck of dust or dirt will contaminate the whole barrel, rendering any experiments performed with the media invalid. Bad media means bad blood—the manufacturer has already been sued once. Today's question is whether the plastic bags holding the media can withstand a long ride down an unpaved road in the bed of a truck with no shock absorbers—a worst-case scenario, perhaps, but by no means an impossible one.

"The truck environment is severe, sometimes very severe," Goodwin says. "But virtually everything ends up on a truck, eventually. A package that loses it here is a package that loses, period."

A laboratory technician cranks up the machine, and the barrels jolt and jerk with a force that makes our jaws quiver. We move on to a more restful room, where students stretch plastic film to test it for tensile strength and push metal rods through cardboard to find its bursting strength. When I ask Goodwin why anyone would care about bursting strength, his eyebrows lift slightly and he clears his throat, as if to lecture a Martian on the purpose of oxygen.

"Goods sent to the Third World are sometimes dropped by aircraft from 18 to 20 feet," he informs me. "We're talking windshields, computers, delicate stuff." In that light, "bursting strength" takes on a whole new meaning. Another machine, a static decay meter, records the amount of static electricity generated by a sheet of plastic wrap. "The computer industry is especially interested in this because static can completely destroy a circuit board," Goodwin says. Also, static generated from plastic bags can spark explosions in places that manufacture, among other things, talcum powder.

Goodwin and his RIT colleagues have worked on a number of intriguing packaging problems, among them a current effort to design an ideal traveling environment for priceless works of art. Typically, art is packaged in wooden crates built especially for the trip. But the panel boards used in many artworks are exquisitely sensitive to moisture and temperature change, and wooden crates do not offer reliable climate control. Hence, it is not uncommon for the canvas to shrink or stretch en route, and for flecks of paint to fall off, not ideal when the object in question is a Rembrandt. Goodwin is currently testing an alternative to the wooden crate, a giant, foam-insulated, aluminum hard shell with a shock-absorbing frame to hold the painting. If the case, originally developed in Spain, passes the truck-bed test, it may soon be shuttling Picassos from Los Angeles to New York.

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Indeed, for some, packaging is not just an important thing, it is everything. Primo Angeli, while emphasizing that the package must be "true" to the product, is also not one to wait around for a product to exist before designing a box to put it in. His most recent venture entails creating entire product lines around packaging configurations—that is, designing the boxes before anyone has figured out what to put in them. His is the ultimate packaging conceit—a master stroke of marketing in which the package truly is the product. For Angeli, though, it's no big deal, just the logical extension of what he has come to know after more than three decades of mucking around in consumer culture.

"If, as the industry says, 'the package is the product,' why not turn things around?" he asks sweetly, like a child wheedling candy. "When you look at a beautiful car, do you think of the engine? When you look at a wonderful piece of clothing, do you wonder about the material? When you first look at a beautiful package, you're not really thinking about what's inside. Creating a dream, an image, that is what packaging is all about." And for some, maybe for many, the dream is enough.

Imagination knows no bounds in these CD packages, part of designer Spencer Drate's collection. A far cry from the plastic "jewel box," the tire holds the disk in its hubcap, the elephant flips it out with its trunk.

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By Bil Gilbert

America's favorite game is the one everybody can play

It doesn't get hyped big-time like other sports, but at the grass-roots level, where it thrives, softball is in a league of its own

Now and then a curious but, I have been told, by no means unique thing happens to me. Call it the seeing-for-the-first-time-something-that-has-often-been-seen-before phenomenon. Driving on a frequently traveled road, you "discover" a barn that has obviously been there for many years. Or, walking along a familiar path, you notice a hard-to-miss knot on an oak tree you've passed a thousand times. Last summer I had an experience of this sort involving the game of softball.

My wife, Ann, and I live in central Pennsylvania near Fairfield, a village of 500-plus people located on the east side of a spur of the Blue Ridge Mountains. Our son, Ky, and his daughter, Amanda, live with us. Amanda has a number of athletic enthusiasms, but her favorite game is softball. When Amanda was 12, she was a decent first basegirl for the Apaches, one of eight teams in a league sponsored by the Fairfield Recreation Association, a volunteer community group. The Apache games were played early in the evening on one of several fields maintained within the village limits.

To do what grandparents are supposed to do, be supportive, Ann and I had dinner early on game days, took our lawn chairs and coffee to the ballpark and sat along the right-field line. So did a lot of other Fairfield people. Some spread out picnics on the grass; others had playpens and strollers to restrain toddlers. In effect, it was a community time-out during which people set aside whatever else was going on in their lives to watch the game and socialize.

The moment of epiphany occurred one evening in July after a midday thunderstorm had cleared and cooled the air. By 6 o'clock the hills to the west were turning purplish and had begun to cast soft shadows on the field. Ann said: "You know, sitting here, doing this, is one of the best times we've had." In context, she was talking about 45 years during which we think we have had our share of good times. While I was reflecting on the truth of this, Amanda started a nifty double play. That started me thinking about the game itself, which was why we were there. Like millions of others, I have played and watched softball for about as long as I can remember. But prior to that evening, or so it seemed to me then, I had never really noticed what an attractive, interesting and—by several definitions—big thing it is.

Baseball may be the national pastime for literary journalists, arty filmmakers and nostalgics. City slickers, celebrities and Hoosiers have basketball. The military-industrial-macho establishment turns to football. But when it comes to what we Americans actually play, softball is indisputably the great national game and passion.

My friend Tom, a policy wonk in Washington, D.C., is the shortstop on his office softball team. One day after work he and his team set off to play a team from the Treasury Department. When they arrived at the field they had a permit to use, they found a squad of Congressional staff people practicing there. The argument that ensued was settled Washington-style. The manager of the Treasury team went off and returned with a policeman and a lawyer, who dislodged the Congressionals.

Betty is a scientist who works in Laramie, Wyoming. For several years I called her frequently for information

Runner on first breaks for second as visiting-team pitcher delivers in game at Fairfield Flames' home field.

Photographs by David Harp

about a research project. After we got to know each other, she warned that it was pointless trying to talk to her after 4 P.M. on Tuesdays and Thursdays during the spring and summer. That was when her coed softball team played. I asked her how they were doing. She said that their pitcher had a mashed finger and was temporarily out of action. "But we're still in third place and when we get the pitcher back we should have a shot at winning the league this year."

Some 50 years ago Pete and I played on a high school football team in Michigan. Following military service and college, Pete got married and went into the oil business in Great Bend, Kansas. He started playing serious softball in the Army, and for about 30 years in Great Bend, he was a better-than-fair first baseman for the Cowboys' Oilfield Specialties. After his knees gave out, Pete managed the Cowboys and occasionally pinch-hit. When we got together recently at a restaurant, we sat for three hours talking about old and present times, but mostly about softball. At one point Pete declared: "This is the absolute truth, Bil. Except for my family and church, playing softball and the people I've played with are what I've loved most."

According to the Amateur Softball Association (ASA) based in Oklahoma City, around 40 million Americans are now playing softball. In addition to picnic and other pickup-type games, there is more-or-less-organized softball for women, men and combinations thereof; for people under 7 and over 70; for those of similar ethnic backgrounds, and religious, political and ideological convictions. There are softball teams for autoworkers, bankers, cops, doctors, filmmakers, prisoners—you name it. But most softball is played by people who simply enjoy the game and don't care much who their teammates or opponents are or what they do off the field.

The origins of baseball have become obscured by

The author interrupted his coaching last year to write about the War of 1812 (January), sect leader James Strang (August) and armadillos (October).

Angie Graeff operates the scoreboard while her dad plays fast pitch on a 103-degree afternoon in eastern Pennsylvania. The bucolic diamond (left), located near the village of Willow Street, was once part of the pasture of the farm visible behind trees in left field.

apocrypha and controversy, but sports historians are generally in agreement about where, when and by whom softball was first played. It was in Chicago at the Farragut Boat Club on Thanksgiving Day 1887 by a frolic of Harvard and Yale football fans. Those sportsmen gathered there to receive telegraph updates about the big football game being played by their respective institutions back East. When it was over (Yale won, 17-8) a Yalie threw a wadded-up boxing glove at a Harvard, who inexplicably was holding a broomstick with which he smartly whacked the glove.

In the crowd was a sober youth, George Hancock, who worked for the Chicago Board of Trade. After seeing the horseplay with the broomstick and the glove, Hancock told his rowdy companions, "I believe this affair can be worked into a regular game . . . , if you will all come down Saturday night I'll make up some rules . . . which will suit the purpose of the sport."

On Saturday Hancock showed up at the clubhouse with a squishy ball, a bat and, as promised, a set of rules. The assembled group began playing in gyms and clubs around Chicago. The next spring the softballers took the game outdoors, and within ten years various forms of it had spread throughout the country.

A turn-of-the-century sporting scribe observed that softball was "a great game played by good fellows." Also, a bit oddly, given the social climate of the time, it was always regarded as a great game for girls and women in Chicago and, even more surprisingly, for coed teams. The mixed-gender game soon caught on elsewhere, as I can personally testify.

In the 1930s, when I first knew my grandmother, Annie Sparks, she was a retired schoolteacher, hobbled by a game knee. We were both big baseball fans but antagonistic ones since she was a ferocious Chicago Cubs rooter and I was for the Detroit Tigers. When I visited her in southern Michigan during summers, we religiously listened to ball games—usually the Cubs, since she owned the radio. Above it was a photograph of a softball team on which Annie had played when she was a stu-

The game that brings us together

The Lorelei Ladies, a fast-pitch team from Atlanta, pretend to pay attention to a batting lesson in 1957.

Anthony Neste

Kathy Arendsen, a terrific pitcher for a championship team in the 1980s, displays windmill-style delivery.

dent, circa 1897, at what is now Eastern Michigan University in Ypsilanti. In the picture she posed with teammates, five of each sex, who were wearing solemn looks, blue blazers, and bloomers or white flannel pants. My grandmother said she was a good fielding second basewoman and a dependable contact hitter but lacked power. She played often and hard for three years before being forced to retire because she tore up her knee in a bicycling accident.

In 1933 a world's fair, the Century of Progress Exposition, was held in Chicago. As an associated festivity, the *Chicago Tribune* organized the first baseball All-Star game for professional players from the American and National leagues. This naturally excited my grandmother and me, but I don't recall our knowing that the first true national championship softball tournament was also being held at the fair.

Despite the Great Depression, 55 teams came—some hitchhiking—to Chicago for the softball tournament. But they arrived with disparate notions about how the game was to be played. A Florida squad, while traveling north, had played against ten local opponents, each of which had a different set of rules and a different size ball. Officials at the Century of Progress decreed that for the games there, "Chicago" rules and 14-inch balls, in circumference that is, would be used. Not surprisingly, teams from that city were crowned national champions in both the women's and men's divisions.

A 1950s book on softball noted that the game had not detracted from female players' "feminine charm."

Above, small-town upstarts from Michigan who won world title in 1906 pose with primitive-looking bats.

The softball games had to compete with such attractions as the Sky Ride, the Streets of Paris and Sally Rand, the famous fan dancer. Nevertheless, the three-day tournament was a gaudy promotional success, drawing 350,000 spectators. Later in the year, the ASA was formed to regulate the game on a nationwide basis. In 1935, with everyone using the same rules and equipment, the national championships were again held in Chicago, but this time the winners were two Ohio teams: the Bloomer Girls of Cleveland and the Crimson Coaches of Toledo.

The ASA's records indicate that the number of softball players has increased each year since 1936, when there were about a million of them. Membership in the association is presently growing at an annual rate of 10 percent—more rapidly, according to ASA historian Bill Plummer, than in any other major team sport.

Crucial to its popularity is that softball is not *a* game but rather a cluster of related ones. Like prospective dog owners, would-be players can look around until they find a softball variant that particularly suits them. Regionally there are some rather bizarre ones. In the Chicago area, the game is played, passionately, with a 16-inch ball called a mushball, cabbageball or clincher. On beaches in California and elsewhere, a version called "Over the Line" is played with three people to a team. In certain Northern locales, the game is sometimes played on skates or snowshoes.

Such oddities aside, the standard breeds, so to speak, are slow, fast and modified pitch. In each, an 11- or 12-inch ball must be delivered underhanded to the batter but, as the names indicate, at much different speeds. Slow pitchers cannot wind up and must throw the ball in a lazy arc, so that it drops down into the strike zone. Using windmill and slingshot windups, fast pitchers wing the ball across the plate at speeds that are often in excess of the best-ever efforts of, say, a Bob Feller or a Nolan Ryan. Modified is just that; the rules require the ball to be pitched at an in-between speed. Each of these games has divisions for female, male and coed teams, and in formal competitions these are further separated into categories determined by age and skill. In all, the ASA now annually stages 64 different national championship tournaments, which is why there are so many commemorative jackets and blazers of the "1982 National Champions Class C, Coed, Slow Pitch" variety.

With 30 million players, slow pitch is the most popular brand. It is a hitter's game in which nearly anyone can occasionally whack the ball smartly. In upper-level competition the whacking is frequent and flashy. The ASA's men's super-slow-pitch division championship was won a few years ago by Steel's Silver Bullets of Grafton, Ohio, who exploded for 75 runs and 56 homers in a *single* game.

In great contrast, no single player so dominates a team sport as does a good softball fast pitcher. With a

Brian McCallum of the Cap Pubs waits to make the play at first base during a game on a field behind the White House. "We're not competitive," he says. "We just have fun hanging out with the people from work."

104-mile-per-hour fastball, one of the best ever was Ty Stofflet, who played for industrial-league teams in central Pennsylvania, long a softball hotbed. Probably his best performance—perhaps anybody's—came during a tournament played in New Zealand in 1976. There, in a game with the host team, Stofflet was matched against Kevin Herlihy, a near peer. To make a very long story short, neither pitcher allowed a run through 19 innings. In the top of the 20th, a walk, an error and a single by Stofflet brought home an American runner. Then Stofflet retired the New Zealanders in order in their last at bat. During the marathon 1-0 contest, he did not give up a hit or a walk, and struck out 33 batters.

In fast-pitch softball, tight, low-scoring games are the rule and no-hitters are not uncommon. This is particularly true in women's games, where formidable pitchers throw at better than 70 mph but from 40 feet rather than 46 feet, which is the distance for men. A current standout is Michele Smith. For the past three years, she has led her Redding, California, team to a national title, and in 1994 she led the American team to the world championships held in St. John's, Newfoundland. The Americans won this tournament, which is held every four years, for the third consecutive time by shutting out China 6-0 in seven innings. During the national and international championships, Smith had a 7-0 record and an earned run average of 0.00.

A decade earlier a dominant pitcher was Kathy Arendsen, who played for a perennial championship team from Connecticut. In 1981 she had a 36-2 record and, with a 75-mph fastball, averaged 14 strikeouts per game. That year in a celebrity game, Arendsen three times faced Reggie Jackson, then the "Mr. October" of the New York Yankees and now a member of the Baseball Hall of Fame. She struck him out in each of his at bats.

This year, for the first time, women's fast pitch will be an official Olympic sport, and the American team will be the gold medal favorite. The men remain on a waiting list for entry into the games.

There have been two notable and somewhat contrary trends in the fast-pitch game. Among men, the strong industrial leagues, where the best players were once developed, have been declining for several decades, basically because of changing economic conditions. In that same period the number of players and the quality of competition have increased dramatically among women, mainly because of federal regulations enacted in the 1970s that require gender equity in sports that are publicly funded. The most obvious consequences have been in schools where 25 years ago the only varsity bat-and-ball game was usually baseball for boys and men. Now more than 275,000 girls are playing competitive softball—generally fast pitch—in high schools. Another 28,000 women are playing on college and university teams. In-

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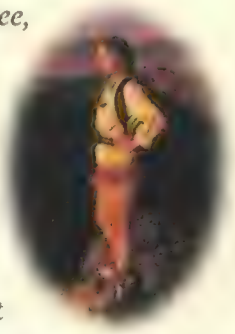

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creasing numbers of them have full or partial athletic scholarships, and after graduating, many go on to play for national and international teams. Such developments have understandably created more softball interest among younger girls.

All of which brings us back to Pennsylvania. The Fairfield Recreation Association started a girls' softball league 15 years ago, but it is for players 12 years old or younger and the game has always been slow pitch. When Amanda and her contemporaries became 13, it occurred to them that (1) they were not going to have any softball until they were eligible for high school fast pitch and (2) they had not played this version of the game. So they began to agitate for somebody to find them a fast-pitch team. The high school coach, ambitious of developing a farm system, emphatically agreed with them. More casually, so did I, among others, and as a result I shortly became the manager of the Fairfield Flames, a 15-girl team of 13- and 14-year-olds. Finding opponents was not a problem, since Pennsylvania has more softball teams (12,770 in 1995) than any other state. The Flames joined an age-group league of ten teams from small towns in our general vicinity.

Before the games I told the Flames they should try to pay attention to each play, not brood about mistakes or the score, and have fun. Mostly they followed this advice. However, the fact that they finished the season with a 13-1 record made it much easier for them to be cool about the joys of victory and the agonies of defeat. On the evening after they had avenged their only loss and won the league championship, some of them came through Fairfield yelling "We're Number One!" But when we got to the ice cream place they began talking about their usual off-the-field topic, boys.

There are earnest critics who contend that competition is bad for youths, and of course it can get out of hand. But in my experience (and in one period of my life I spent most of my spare time coaching) winning and losing seems to provide a benign form of stimulation and tends to make young players more cooperative, less selfish. If there is a problem, it is apt to be with the parents, not their children. I have a friend who coached young peoples' softball and baseball teams for ten years. He swears he is not going to do it again unless he comes by a team of orphans.

Athletic merits aside, softball has a number of what might be called social virtues that are easy to overlook or forget because they are so obvious and homely.

It is the most egalitarian of our major sports. Without much instruction or practice, most of us are agile enough and sufficiently coordinated to have fun playing some kind of softball. Also, unlike nearly all other games, it has never been closely or exclusively associated with one of the sexes, a particular race, or an economic or social class. Long before the term "cultural diversity" was invented, softball had naturally evolved as a game for everybody and anybody.

It is perhaps the least commercialized of our major sports. Rich men play on softball teams but do not invest in and squabble over them. Softball has no unions, agents, flacks or—except, as noted, occasionally in Washington—lawyers. Softball players spend $300 mil-

Amanda Gilbert (left) and Flames teammates discuss game strategy (or, possibly, boys) in the dugout.

lion a year on their equipment, but none of them are trying to sell the rest of us shoes, beer or junk food.

Finally, it is the most social of our major sports. Again, take the Fairfield Flames, for example. In addition to 15 players, five coaches were at all the practices and games. Twenty-eight parents—two of the Flames were sisters—attended nearly all of the games (home and away), chauffeured the players, raised and spent money for equipment, washed and mended uniforms, and so forth. Three members of the Fairfield Recreation Association mowed, raked and lined the fields on which the Flames played. During the Flames' season, ten different umpires—adults who, according to league rules, could not be connected with either of the teams—officiated their games. Then there were the opposing teams, together with all of their supporters.

If every softball game is thought of as a cooperative production, then there are probably at least as many nonplayers who contribute to it as there are players. Since there are some 40 million of the latter, this game may bring more of us more closely together than any other one of our common activities. It is therefore not only a good pastime but one of the Very Good Things we have going for us.

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By Helen Dudar

Cézanne's endless quest to parallel nature's harmony

After all the analysis of his apples, his bathers, that mountain, his paintings still electrify in a show coming to Philadelphia

Surely nothing tells us more about Paul Cézanne's unsinkable faith in his own genius and his obsessive drive to justify it than the fact that he painted for years with little formal recognition. A bruised veteran of a few group shows, Cézanne had to wait until 1895 for a full-scale one-man exhibition in Paris. By then, he was 56 years old and had been so long absent from the mainstream art scene that some of the regulars thought he was dead.

The impact of that event was immediate and lasting. Other artists looked at the work—at the way he used color without line to suggest form, at the still lifes that transformed complicated arrangements into holy objects—and those with francs to spare succumbed to the lust to have one, to pierce the mysteries of his vision. The critics rarely stopped sneering, but Monet, Renoir and Degas bought paintings, and a few years after the show, a young, impecunious Henri Matisse was making payments on a small, treasured *Three Bathers*, a work that would transform his imagery and technique.

If the 1895 exhibition lit a few fires, the great homage of 1907, a year after Cézanne died, was close to an explosion. At least one art historian believes that Georges Braque and Pablo Picasso saw it together, taking in the skewed perspectives in the late portraits and the naked

Still Life with Onions: the onions lend a rustic touch to this study of transparent and opaque materials.

In his 1875 self-portrait, Cézanne portrayed himself as an unruly cross between bourgeois and peasant.

bathers that looked like invented figures; he is persuaded that, as those young men moved, stunned and shaken, past fertile offerings of Cézanne's late artistry, the former turned to the latter and said something like, "Pablo, we've been doing it all wrong."

In no time at all, correctives were in place. Picasso went back to his atelier to work on a painting of large angular women imagined as stylized objects; with *Les Demoiselles d'Avignon* the focus and direction of modern art was transformed. So was the language. Only a year later, Matisse, making his way through a joint Braque-Picasso gallery show, could not resist a cheerfully acid comment. "Oh. See the little cubes," he said. Cubism had arrived, and a platoon of artists from Klee to Kandinsky would go to school with Cézanne.

To Picasso, Cézanne would forever reign as "my one and only master!" For a time, in his youth, he packed a gun, waving it half-seriously at anyone who annoyed him, particularly anyone insulting the memory of Cézanne. "One more word," he would say, "and I fire."

Now, to be sure, late-Cézanne landscapes do suggest arrangements of cubes, and Cézanne's big, nude, featureless bathers verge on abstractions. All of this is demonstrated in the sprawling, demanding exhibition of his art that reaches Philadelphia next month. (The sponsor is Advanta, a financial institution.) But as you

From a nearby knoll, Cézanne painted his last, most-heroic *Mont Sainte-Victoire* series; here, an oil (c. 1902).

work your way past some 100 oil paintings and 70 works on paper, you may find that seeking clues to Cézanne's impact on later artists can be a blight as well as a blessing. It is a little like trying to parse sentences in Henry James' gloriously complex late novels.

The exhibition at the Philadelphia Museum of Art from May 30 to August 18 is the final stop in a celebration that began at the Grand Palais in Paris last fall—the centenary of that seminal 1895 retrospective at Ambroise Vollard's gallery—and then moved on to the Tate Gallery in London.

Certainly there have been other major Cézanne shows in years past, but Joseph Rishel, one of the principal organizers of the current one, believes this is the first exhibit in six decades to offer a full survey of the artist's life's work. A figure of florid charm, Rishel is Philadelphia's senior curator of European painting before 1900;

"The structure is more and more implied, and less and less apparent," wrote scholar Lionello Venturi.

With her center part and steady gaze, Cézanne's wife, Hortense, is an island of calm amid complexity.

leading a group of art writers through the Grand Palais last September, he swiftly confessed to being "hopelessly biased" on Cézanne—"arguably the greatest painter to come out of the 19th century."

The exhibition's first shock is some of the early paintings; while fascinating and revealing, they hardly hint at greatness to come. The works from Cézanne's 20s are dark, angry and often violent images of male cruelty to women, bearing such titles as *The Abduction* and *The Murder.* Those early pieces surely reflect the tormented young man who studiously dressed like a beggar, who was full of rage and haunted by depression, who could not bear to be touched, who suffered agonizing shyness around women and who felt out of place almost everywhere. "Life is fearful," he would say, or, "The sky of the future is overcast."

His 30th birthday had come and gone when two events brightened the heavens, not to mention his canvases. Cézanne met and began to live with a young woman named Hortense Fiquet, who bore his only child, Paul, and stolidly sat for dozens of portraits that scarcely suggest affection. In time, she seems to have become more of a convenience than a companion.

Soon after Hortense gave birth to their son, Cézanne had the luck to fall under the spell of Camille Pissarro. Ten years his senior, Pissarro was kind, gentle, gifted, a source of fatherly friendship and direction. For several years, they painted together in the countryside north of Paris, and Pissarro's influence briefly transformed Cézanne into an Impressionist. He would eventually move beyond that style, but he began to realize what could be accomplished with brilliant blues and greens, and to respond to the demands of his craft. "It was only when I kept company with Pissarro, who painted nonstop," he once said, "that I learned discipline."

Cézanne never did learn to control his anger. When his eye failed him or when his work was interrupted, he could explode in fury: brushes would be broken, a half-finished canvas slashed or simply discarded in the brush by some country road. Vollard once visited Cézanne in Aix-en-Provence; the first object he noticed upon stepping into the studio was a huge picture "pierced full of holes with a palette knife."

Aix was the sleepy medieval town where Cézanne was born in 1839 and to which he always returned from painting expeditions around the country. Presumably, his spiky temperament grew out of the hard circumstances of his youth. His father, Louis-Auguste, was an authoritarian, miserly man who achieved wealth and then power, first as a prosperous dealer in hats, later as the owner of the only bank in town. He did not marry the mother of his children until Paul was 5.

A steady flow of profits allowed the elder Cézanne to acquire and renovate the Jas de Bouffan, a handsome 18th-century manor on 37 acres. In that old town, riches did not guarantee social respect. According to John Rewald, Cézanne's biographer, the Cézannes were pretty much ostracized as parvenus, and the son forever found it difficult to make friends.

But in adolescence, he cemented one friendship that would sustain him for decades. Together with a third schoolmate, Cézanne and Emile Zola became "the inseparables." They roamed the radiant countryside and bathed in the Arc River; they read Victor Hugo and memorized Baudelaire. And almost anywhere they went, Mont Sainte-Victoire loomed on the horizon, a huge, brooding, gray-rock pyramid that would become an obsessive subject for Cézanne in the years ahead.

Even after Zola moved on to Paris they maintained a close friendship and an intimate correspondence. The budding young writer would provide hospitality, encouragement, even spare cash when the elder Cézanne's stingy doles failed to cover his son's needs. Actually, years passed before Cézanne acknowledged to his father that his expenses included a mistress and a son.

At his father's insistence, young Paul had unhappily begun law school in Aix. But his spare hours were spent copying works at the town's little museum. Eventually, in 1861, the elder Cézanne agreed to allow his 22-year-old son to study art in Paris. He stayed for five difficult months. "The least obstacle reduces him to despair," an exasperated Zola wrote to a friend.

Cézanne went home and put in time at the family bank where, legend has it, the ledgers were his sketch pads. By late 1862, he was ready to try Paris again. As he had earlier, he became a student at the Atelier Suisse, and this time he made important friends: Pissarro, Renoir, Sisley, Degas. They were seminal connections—a new generation groping toward a style that would be called "Impressionism," applying techniques that the traditionalists among the students regarded with scorn and contempt. A man with Cézanne's unease could feel comfortable among those outsiders.

In the great city, Cézanne began what would be an unchanging habit during his Paris stays: some part of the afternoon he spent in the Louvre, filling sketchbooks with drawings of sculptures and paintings by the masters. As he once wrote, "The Louvre is the book from which we learn to read."

Certainly those early imagined scenes of erotic violence were the work of an imperfect "reader," betraying a lack of control and an absence of models. On the other hand, the earliest portraits—the brooding image of Uncle Dominique as a monk—impaled on canvas in thick slabs of a palette knife are transfiguring. "Painting

Cézanne worked out formal problems in the *Bathers* series, but this oil sketch is unusually lighthearted.

like a bricklayer," Joseph Rishel calls it, as a way of praise. And the first few times Cézanne set down an arrangement of kitchen items—*Bread and Eggs*, for example—the results promised a remarkable body of vibrant works created out of everyday objects.

Public approval was absent. Cézanne's work had been included in an 1863 outsider exhibition, but in 1867, when two entries were refused for an establishment show, a critic for *Le Figaro* went to the trouble of ridiculing "M. Sésame" and his rejected paintings. Seven years later, three Cézannes could be seen in what was the first Impressionist exhibition, and a journalist denounced their creator as "a sort of idiot who paints in the throes of delirium tremens."

By the early 1870s, Cézanne had settled into the rich, verdant countryside around the towns of Pontoise and Auvers-sur-Oise, not many miles north of Paris, and was laboring steadily alongside Pissarro. Years later, critics would accuse the two of copying each other during that period. Pissarro's calm response was that surely they influenced each other, and just as surely each artist responded to a landscape in his own way.

Actually, Cézanne would soon part from the Impressionist way of looking and would leave it far behind. A farmer who watched the two men at work once noted that Pissarro was "stabbing the canvas" while Cézanne "slapped" the paint on. An Impressionist "stabbing" a canvas was interested in idyllic natural scenes awash in light and color. Cézanne's short, parallel, often slanted strokes created a lively texture on the surface of the canvas but, more importantly, introduced a mathematical rigor and precision into his pictures.

Cézanne's landscapes shimmer with color—and without obeisance to the sun's light—and sometimes appear to stretch for miles toward the horizon. There was another crucial difference in much of his work: an absence of signs of human existence. As a rule, in a Cézanne countryside view, not a child is to be seen on a road or a cow in a field; there is no narrative in his landscapes. And among the elements that spoke to the next generation of artists were the squares and triangles so artfully set down on the surfaces of his later works. The images in *The Gulf of Marseille seen from L'Estaque,* for example, might be the walls and rooflines of a cluster of houses or an arrangement of cubes and cones.

Experts continue to debate his role

Still, for every dozen experts who rank Cézanne as the great god of modernism, we are confronted with at least one authority proposing that we rethink the idea of his modernism. For example, Françoise Cachin, director of the Musées de France and one of the three organizers of the exhibition, bluntly sees that role as "overplayed," and the work "too often observed from a modern point of view." Cézanne clearly influenced 20th-century art, she has said, but "he also embodied his own era. . . . Cézanne was not an abstract artist."

It is striking that while we have a generous body of biographical material on Cézanne and a wealth of letters to family and friends, Joseph Rishel, among others, insists that we know little about him "in terms of daily factual mundane detail. Whole years of his life go past and we might have a street address, we might not."

Rishel is certain of one thing: that for all of Cézanne's self-doubts, the sneers of critics, the rejections of the art establishment, his faith in his gift was strong. "He knew

In the early 1890s, Cézanne painted five major versions and numerous sketches for his *Cardplayers* series; this oil was done after the larger one at the Barnes Foundation. Workers at the Jas de Bouffan, where he had lived since he was 20, served as his models.

he was different. He somehow always knew he was out there." Or, as Cézanne late in life told a young artist, "I have perhaps come too early. I was the painter of your generation more than my own."

Except for fellow painters who set up their easels alongside him, the only witnesses to Cézanne at work were those who posed for portraits, and the only sitter who has left a substantial account of the process was Ambroise Vollard. In his little 1914 book, *Paul Cézanne*, Vollard reported that the portrait required an astonishing 115 sittings.

Some experts have questioned the count, believing that Vollard tended either to embellish reality or to ignore it. (Vollard's book never mentions, for example, that his 1895 show was organized at the urging of Pissarro, Monet and Renoir, who understood Cézanne's importance.) In any event, at the rate of 115 sittings for one portrait, it is hard to imagine a lifetime labor that could produce more than 950 oils and close to 650 watercolors.

While at work, Cézanne required absolute silence; according to his dealer, the sound of a barking dog could destroy his concentration. He also wanted absolute immobility from his subjects. Once, when a numbed Vollard dozed off and tumbled from his perch, an exasperated Cézanne scolded him: "Do I have to tell you again you must sit like an apple?"

Apples were ideal subjects; they did not fidget. Their obedience may help to explain how a relatively minor genre—the still life—became, in his hands, a body of major work. A variety of objects may be seen in those arrangements, including oranges and onions and tableware; but apples, voluptuously round and rosy, hint at what might have been accomplished had Cézanne been able to deal with his discomfort with live naked women.

Hortense, who apparently had no trouble sitting like an apple, was his most frequent female subject. While many of his portraits of men are intense and penetrating, including at least 30 self-portraits, images of Hortense often suggest Cézanne still lifes. His references to her in his letters are certainly polite and even affectionate, but in private he called her "*La boule*," a label suggesting an object without noticeable intelligence, say, a round wooden missile for a game.

She and Cézanne were not married until 1886. Only a year earlier, he had been involved in an intense affair about which nothing is known except that mail from his lover was sent to the residence of Zola, who forwarded it to a safe address. The Cézanne marriage commanded the attendance and presumably the approval of the elder Cézanne. If nothing else, the ceremony legitimized Cézanne's treasured 14-year-old son. Cézanne's father died soon after, and the artist was at last free of financial worries.

The year of Cézanne's marriage was also the year when Zola dealt their friendship a fatal blow. He published *L'Oeuvre* (*The Masterpiece*), a novel about a subject on which he considered himself to be expert. Its dominant figure, Claude Lantier, is a failed painter who can

Freelance writer Helen Dudar, of New York City, last wrote about Johannes Vermeer (November 1995) and the film Jefferson in Paris *(March 1995).*

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neither abandon nor complete a major work, and in despair finally hangs himself.

Claude Lantier was supposed to have been a composite of several contemporary artists, but Cézanne saw a close resemblance to himself and took the story personally. The fiery young journalist who had once defended a maligned avant-garde was now a popular novelist rather out of sympathy with the new art. As he always did, Zola had taken care to see that Cézanne received a copy of the novel. Cézanne acknowledged it in a curt note. They never again exchanged a word. But Cézanne apparently never abandoned memories of their intimacy. When in 1902 the news came that Zola had died, he locked himself in his studio and wept all day.

That episode was a rare instance of Cézanne giving way to tears. As age overtook him, the townspeople saw only a frail, unsociable old man who went into the countryside on clement mornings and came back to lunch at the Deux Garçons Café, where meals are still served today. After World War I, Roger Fry, the Bloomsbury painter and critic for whom Cézanne was a lifelong obsession, toured Provence in search of material for a book and found that the shopkeepers of Aix had little to contribute. All they recalled was "an old man who was rather cracked." Indeed, when Fry was a student in Paris in the 1890s, he would later remember with amazement, not once did he hear "the name of the recluse of Aix."

"Recluse" is poetic license. After the 1895 exhibition, young admirers hunted Cézanne down and were politely welcomed. But his last years were not easy. He developed diabetes with its attendant afflictions. When his aged mother died, the family homestead was sold so that her estate might be divided among a son and two daughters, and he had to find new living quarters.

Eventually, Cézanne settled into an apartment in the center of town with a housekeeper. In time, he built a small two-story studio outside the city, with commanding views of Mont Sainte-Victoire. Repeatedly, he set down images of that great rock, massive, menacing, mysterious; there are 75 views of Mont Sainte-Victoire on canvas and paper. For the young artists of the early 20th century, the sight of some of those late landscapes flowing from the mountain must have been dizzying: depending on where you stood, the houses and trees were houses and trees or simply abstract forms.

In the last month of his life, Cézanne, exhausted by a recent heat wave, wrote to his son, "With my nerves so weakened, only oil painting keeps me alive." Then, one day in mid-October 1906, as he worked near his studio, he was caught in a violent thunderstorm. Passers-by found him collapsed and drenched and wheeled him back to town in a laundry cart. In little more than a week, Cézanne was gone.

Nine decades later, he is not merely an Aixoise cultural icon but a major industry. The city fathers have lately paid the lavish sum of 25 million francs for the Jas de Bouffan and what remains of its reduced acreage; it will not become a public place until the current owner, whose grandmother bought it from the Cézannes, has died. Les Lauves, the once-isolated hillside studio, was rescued from demolition by devout Cézannistes some years ago and is now a shrine, filled with artifacts and shadowed by huge apartment dwellings. And scattered about town are a Cézanne retirement home, a Cézanne school, a Cézanne garage and a Cézanne hotel.

The tourist bureau has produced a slick brochure in three languages entitled "Circuit Cézanne" for worshipers who want to follow the artist's walks from 23 Rue Boulegon into the hills. And to make certain that visitors will feel secure tracking the great man, Aix has provided an inspired piece of kitsch: large brass studs emblazoned with a "C"—marking "the footsteps of Cézanne"—are now embedded in the old stones of this old place. Surely, an artist who wanted desperately to be taken seriously could not have imagined a more tastelessly devout tribute.

On the other hand, the more rewarding sight for an explorer might be found outside town near the Château Noir, a large crumbling house that Paul Cézanne painted many times and where he sometimes stored his art gear. Alongside the chateau is a path marked *Privé.* If you ignore the sign and slip a few feet beyond it, you are suddenly confronted by the sight of Mont Sainte-Victoire standing guard over a stretch of land carpeted in a dozen different shades of green. It's not a living Cézanne, but it surely and touchingly bears silent witness to the artist's inspiration.

Gardanne (c. 1885): the paintings of the town are from different viewpoints, as if Cézanne rotated it in his head.

By John F. Ross

In the company of cannibals that sting...and glow

Found everywhere from beaches to 14,000 feet up in the Himalayas, scorpions kill more people than any other animal except snakes and bees

Field biologists say thank you in peculiar ways. After a woman in Baja California serves us a delicious dinner of fresh fish and tortillas, the world's preeminent scorpion expert, Gary Polis, leads our group of a dozen scientists into the woman's modest hut, each of us carrying light bulbs and batteries, forceps and specimen bags.

Our host, Manuela Villalejos, a stout and friendly woman, looks on with amusement and a fair share of skepticism. We've turned off the kerosene lanterns, and the one-room space barely contains all of us; we bump into each other in the darkness, good-naturedly cursing each other's clumsiness. Then, the soft blue of an ultraviolet light (known as a black light) clicks on, followed by another; each bathes the room's sparse contents and straw roof with a cool purple-blue light. The corner of Manuela's hut explodes in a flash of neon orange: it's her altar fluorescing like a 1960s psychedelic poster.

The lights sweep the ceiling and wall for only a moment, until someone shouts "Got one!" All eyes turn to the ceiling, where the light has caught the unmistakable shape of a scorpion that glows like a green neon light. Polis balances precariously on a stool and slowly reaches toward the glowing animal with a pair of long forceps. With a deft and quick movement, he grabs the scorpion, a member of the deadly genus *Centruroides*, by its tail and drops it into a bag. We resume our search, and pretty soon we're catching them all over the place. The ceiling and walls are literally swarming with these sinister-looking creatures, each no more than two to three inches in length. Watch this, says Polis, after he locates another scorpion and we draw to within two feet of it. He clicks off his black light and turns on his incandescent headlamp. I can't see the scorpion in regular light even though I'm looking directly at it.

Like a bomb-detection unit, we continue to sweep, passing over the straw ceiling above the bed. We catch a dozen in a few short minutes—many others scramble out of reach into the straw. The popularity of these straw-thatched roofs across Mexico, explains Polis, accounts for much of the reason why scorpions still kill at least 800 people in Mexico each year. (Across the world, these creatures kill thousands of humans annually, more than any other animal aside from snakes and bees.)

Polis shows Manuela the fruits of our labors, a small plastic bag full of writhing scorpions. She's surprised but nods approvingly, glad that we've rid her house of these pests. He smiles but says that we've only dented the population and that we'll come back.

Polis, a professor at Vanderbilt University, is a man who seems to be in perpetual motion. Hiding a wry grin under his bushy mustache, he is fond of loud Hawaiian shirts and enjoys regaling students with stories about the ferocious denizens of the deserts, particularly the scorpion. Upon hearing that he is planning an expedition to Sonora and Baja California, I quickly sign on. Baja reputedly has the largest density and greatest diversity of scorpions in the world. The use of portable ultraviolet bulbs in the field has been around since the late '60s, and it has blown the top off scorpion studies. The technology has given us a better understanding of an animal more peculiar than we've ever imagined: a sexual gymnast, gladiator, cannibal.

I join Polis to learn why a handful of scientists devote their lives to an animal on everyone's shortlist of the least favorite organisms on Earth (unless, of course, you happen to be a 10-year-old boy). Because the original arrangement had no room for anyone else, I rent a Volkswagen bus. It quickly proves its worth as a mobile arthropod zoo, and I commit to spending two weeks crossing the desert looking for scorpions and visiting islands in the Sea of Cortés (aka the Gulf of California).

Reality first hits me when I receive a pair of snake chaps in the mail. Dark brown leggings, they are made of a puncture-resistant fabric. I ask Polis why I need this clothing. He responds: "Scorpions glow, snakes don't." Those words resonate as we walk back from Manuela's house in the tiny fishing village of Juncalito, not far from Loreto. Volcanic mountains seem to push the handful of straw-thatched huts to the rocky edge of the

Philip Brownell uses a black light to fluoresce a harmless *Hadrurus* in Mexico's Sonoran Desert.

Born soft and vulnerable, newborns crowd together on their mother's back for days and sometimes weeks. They live on stored nutrients during this time but may be able to absorb a little water from their parent.

sea, a remote stretch of shore about halfway down the Baja Peninsula.

In the darkness, I'm overly conscious of my feet even though they're safely enclosed in stout boots. As a safety measure, we black light our campsite, a stretch of beach with a lean-to shelter. I find a four-inch specimen of *Hadrurus*, a genus of scorpion often seen in the American Southwest, sitting a couple of feet from my bed, a cot on tall legs. A few feet beyond this one lies a much smaller but far more worrisome *Centruroides*, a member of the only potentially fatal genus in North America.

Earlier that evening, we took our black lights out to the water's edge, a tangle of rounded stones that jingle like loose change as the waves sweep in. At the waterline, we turned over rocks and piles of wet seaweed, revealing thousands of isopods, cockroach-like crustaceans, which swarmed over our hands. I decided to hold the black light while others dug, and soon we discovered brown, three-quarter-inch scorpions everywhere. Polis has calculated that the population of *Vaejovis littoralis* can be as dense as 12 individuals per square meter, the equivalent in the scorpion world of Times Square after the theaters let out. Half their lives, these smallish creatures are immersed in salt water as the tides of the Sea of Cortés sweep in and out. Polis found that many species can survive total immersion for 48 hours. It's discoveries such as these that are crashing long-held notions about scorpions. Evolutionary wunderkinds among arthropods, scorpions have adapted to diverse habitats on all major landmasses except Antarctica. They range as far north as Canada and as far south as the tip of South America. They inhabit the driest, most-severe deserts and are found under snow-covered rocks above 14,000 feet in the Himalayas. They live in the crevices of pineapples and at the edge of the sea and in caves at depths of up to a half-mile. Remarkably hardy, they can be super-cooled below the freezing point. They can withstand heat up to 115 degrees F, submersion, starvation up to a year and even intense doses of high-energy radiation.

Their evolutionary triumphs and toughness certainly haven't won many accolades from another highly successful species—humans. That keen nature observer of the first century, Pliny the Elder, made his feelings clear: "They are a horrible plague, poisonous like snakes, except they inflict a worse torture by dispatching their victim with a lingering death lasting three days. . . . Their tail is always engaged in striking and does not stop practicing at any moment, lest it should miss an opportunity." His words seem to speak for all humans. Few crea-

John F. Ross, of Bethesda, Maryland, most recently wrote on real vs. perceived risks, the invasion of zebra mussels and other exotics, and ventriloquism.

tures are more difficult to anthropomorphize: with their sharp, probing pincers, evil-looking stinger, eight legs and predilection for dark places, scorpions represent our primordial nightmare incarnate. They cause instructive fear.

People across the world universally revile the scorpion. The Bible and the Talmud castigate it as the vilest pestilence. In Persian mythology, an evil spirit sent a scorpion to sting the testicles of a sacred bull whose blood was to fertilize the Universe.

Until recent years, science knew little about scorpions because these creatures often inhabit hostile environments and are difficult—not to mention dangerous—to catch. Before the days of black lighting, biologists could only collect scorpions by laboriously turning over rocks during the day and setting pit traps. Scorpion species that burrowed in the sand or sheltered in rock crevices remained entirely hidden from science. The discovery that all scorpions fluoresce under ultraviolet (UV) light quickly changed all that.

Since biologist Stan Williams reported his success with black light in 1968, the number of known species in the United States has jumped from 38 to 92. About half of these were discovered by black lighting; the rest, by a field invigorated by new scientists who went back to existing collections. Taxonomist David Sissom, of West Texas A&M University, believes that the present figure of 1,500 represents only half of the world's actual number of scorpion species. Only the United States, Baja California and Namibia have been effectively searched using black lights.

No one knows who first discovered that scorpions fluoresce; perhaps it was prospectors in the 1930s who took black lights out into the Southwestern desert in search of fluorescent minerals. Today, amateurs comb the deserts with their own black lights and have turned up new species, much like amateur astronomers have helped with the discovery of comets.

In 1973, as an ambitious graduate student at the University of California, Riverside, Gary Polis conducted the first exhaustive field test of scorpions using portable black lights. For five years, Polis trudged out into a dune system near Palm Springs known as Windy Point. He found a violent world: the dunes were a miniature battlefield where some species eagerly feasted on their mates, children and neighbors.

Cannibalism seems difficult to justify in evolutionary terms. Facing many outside threats, a species hardly needs to have its own members devouring one another. Polis postulated that such cannibalism could in fact be part of an adaptation that others have dubbed the "lifeboat strategy." In this scenario, cannibalism has evolved as a survival mechanism for an organism that lives under some of Earth's most severe conditions. In other words, when the going gets tough, scorpions have

A sand scorpion ingests a victim of another species. Cannibalism increases the odds of survival . . . for some.

Lethal-looking appendages, at center, are used to tear prey into small pieces. Digestion precedes swallowing.

The "toothed" leglike structures are pectines that males sweep over the ground, seeking female pheromones.

The stinger, backed by a sac of venom, is used both to immobilize prey and for defense against predators.

a wider window of survival than other animals because they can count on eating their own kind. Even more interesting, Polis discovered that cannibalism radically restructures the scorpion community. To avoid the threat of older scorpions of the same species, younger individuals hunt in different places and at different times. In some cases, scorpions from the various age groups within one species exhibit far greater behavioral differences than those found between the adults of different species. The discovery of such pronounced age-group differentiation in scorpions has prompted scientists to look with renewed interest at cannibalism and age-specific traits in other animals, including vertebrates.

Among our group in the Baja desert is Philip Brownell, a professor of zoology at Oregon State University in Corvallis and the world's leading expert on scorpion physiology and behavior. Where Polis looks at the ecology of the scorpion, Brownell concentrates on the physiology. To support his research, he must collect large numbers of specimens while on our expedition. Long and lean, a distance runner by temperament, he has become the Wild Bill Hickok of scorpion collecting. I couldn't help but challenge him to a scorpion roundup in the Llano El Angel, a remote and desolate sand dune system deep in the Vizcaíno Desert near San Ignacio. Brownell's handicap is an undergraduate student, Jeff Baur, at my elbow. We each have an hour to collect before the moon comes up and the scorpions all return to their burrows.

A blue universe just 20 feet across

Standard scorpion field equipment includes a long black light connected to a cord that winds over the shoulder to a backpack containing a 10-pound motorcycle battery. The undergrad and I take 12-inch forceps and a stack of nesting plastic cups. Completing the ensemble are a headlamp, snake chaps and glasses that protect against UV light.

The sand dunes rise more than a dozen feet in spots, the soft white sand marked with a sparse covering of creosote bush. We begin our search, our universe limited to a gentle bath of blue light that softly penetrates the darkness in a 20-foot halo. Above, the Milky Way stretches grandly across the sky. The moment I turn on my black light I see a glowing spot a dozen feet away on my left. It's our first scorpion, and I sneak up behind it so it won't scurry back to its burrow. If you miss a scorpion on the first try, it winds up its stinger above its head like a batter ready to hit a fastball, then sprints for the safety of its burrow.

Robbed of its protective mantle of darkness, the scorpion is vulnerable and easy to grab; I snag it easily with my forceps, immobilizing its tail. It writhes furiously, and I drop it carefully into a cup. Later, I sweep the side

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After pouring molten lead into a scorpion's burrow and letting it cool, Brownell excavates the result.

The casts are reverse models of the burrows, where some species safely spend 90 percent of their time.

of a dune and catch six in my beam—it's as though stars have fallen to the sand.

While picking up scorpions seems almost routine after 20 to 30 encounters, navigating in the dark never becomes easy. We stumble over bushes and slide unsteadily down the backs of dunes. It's clear to me how unsuited we humans are for life at night.

Earlier in the evening, Brownell had given me an elegant demonstration of how scorpions survive in their world. In the dark, we found a male sitting outside his half-moon-shaped burrow waiting for a meal. Four inches from the scorpion, Brownell wiggled a twig, submerging its point under the sand. The scorpion immediately rose up on its legs, then swiveled toward the twig like a tank turret. In a flash, the scorpion moved closer, then jammed its pincers into the sand. With furious intensity, its legs whirled like a Rototiller, and the creature sank into the sand until it had the twig firmly in its pincers.

It was Brownell who proved conclusively that scorpions do in fact respond to mechanical vibrations in the sand up to a foot away, not unlike spiders tending their webs. When sensing burrowing prey, the scorpion forms its legs into a circle. When a vibration passes through the sand, it reaches each of the scorpion's legs at slightly different intervals. With an instant analysis of these microsecond delays, the animal can determine the direction of its prey.

After Brownell's demonstration, I'm certain that the scorpions we sneak up on know we're there. Still, they generally rely on their natural camouflage to hide from large predators. By the time our hour is up, we have practically run out of specimen cups. We return to the sandy road and the VW bus and start counting. I note with concern that Brownell's hip bag, stuffed to bursting with plastic bags at the beginning of the hour, is nearly empty. His technique of snagging a scorpion, then stuffing it inside a bag and dropping it over his shoulder into his knapsack has proven a much faster collection technique than our stacking cups: he has collected 75 individuals, my team only 55.

Venomous arthropods loose in the van

With collection rates like these, some 1,000 scorpions pack my van by trip's end, not to mention a host of other venomous desert dwellers, such as black widows and wolf spiders. This arthropod zoo will be split up and sent to labs all over the world. In the meantime, plastic bags and bottles, cups and suitcases fill the back of the bus to bursting. Occasionally, an animal escapes and crawls across the floor. I swallow my impulse to squash the escapee, thinking that science may benefit in some small way from this one creature. Gradually I overcome what seems like a genetically programmed human in-

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Even after two decades of study, Gary Polis has lost none of his fascination for the order Scorpionida.

stinct to kill scorpions on sight and come to an uneasy truce with my curious cargo.

Scorpions were one of the first creatures to climb from the sea onto the land some 350 million years ago. Some of these creatures were indeed monstrous, measuring up to a yard long and carrying the name *Brontoscorpio*. Scientists figure that these nightmares needed water to support their weight.

Surprisingly, their transition to land meant very few changes in the scorpion form, or morphology. They grew lungs instead of gills and adapted their legs for walking. These amounted to insignificant changes, considering they moved from water to a predominantly desert environment. Even today, a scorpion that lives in the mountains generally looks like the cave-dwelling species; a desert dweller, like the intertidal species.

If their body structure has changed little over hundreds of millions of years, how can they attain such a wide geographic distribution, especially in the face of nature's indignities, such as asteroid impacts, ice ages and the like? Quite simply, they've survived by masterful adaptations in their behavior, physiology, life history and ecology. They've thrived by becoming a kind of biological goulash—a blend of the features of the most simple terrestrial animals with those of the most modern mammals. A scorpion's extraordinary plasticity is evident immediately in its metabolism. In an environment that can bring feast or famine, the scorpion can conserve precious energy by shutting down its metabolism. On the other hand, the mother scorpion gives her offspring a head start with a long period of gestation and care after birth. The newborn immediately climb onto their mothers' backs and stay there through the first larval stage, living on stored nutrients.

Burrows are salvation out in the dunes

Phil Brownell and I discover one of their masterful adaptations on a sand dune system across the Sea of Cortés near the Sonoran town of Bahía Kino. The night before, we had black lit the dunes, capturing individuals outside their burrows, then marked the location of the burrows. In the morning we return to the burrows with a stove, a long-handled ladle and an ingot of lead. After melting the lead, we pour it into the burrow, forming a cast of the animal's living quarters. After it cools, we brush away the sand to find an incredibly banked, shimmering spiral that forms a corkscrew descending nine inches into the sand.

It's no small wonder that the scorpion relies on its burrow in a dry desert environment. With its high population density, about one every two square meters, the scorpion is a tasty morsel to lizards, small mammals, larger scorpions and other animals. Owls are fond of sweeping in from the sky, biting off the stinger and consuming the rest. Consider that pound for pound, only ants and termites exceed the biomass of scorpions in desert environments, and the importance of these animals in the desert food web is clear indeed.

One scientist calculates that one species of sand scorpion spends 92 to 97 percent of its life in its burrow. Behaviorists such as Brownell puzzled over how scorpions can possibly coordinate mating when so much of their life is solitary. Brownell found the answer while studying the pectines, organs unique to the scorpion and located underneath its body. Looking like a dried pair of legs, the pectines are lined with comblike arrays of sensory receptors. Brownell believes they are the same basic organs that evolved into antennae among insects. When a female is ready to mate, she drops a chemical message, or pheromone, on the ground. In the course of hunting, the male scorpion runs over the sand near his burrow, sweeping intermittently like a street-cleaning truck with his pectines. When he comes across her pheromone, the chemicals communicate a message loud and clear: "I'm a female scorpion of your species and I'm ready to mate."

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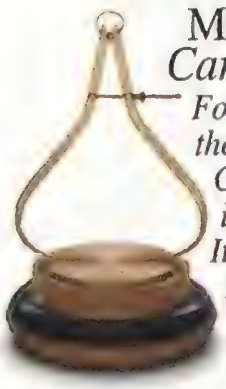

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that biologists have dubbed "juddering," a term that sounds more like an ode to punk rock to me. This lurching sends seismic waves through the sand and lets the female know that a male in the vicinity is interested.

The pheromones are a very private affair—complex chemical mixtures usually readable only by members of the same species. Such methods of communication, however, could pose grave problems in a severe habitat packed with competing scorpion species. Brownell believes that some larger species may concoct false codes to entice an amorous scorpion of smaller size into a deadly trap. Thus privacy of the code is critical: widespread discovery could tilt the balance toward extinction, just as a cracked encryption code can change the course of a war.

One careless moment, one arm disabled

One morning after a long night of black lighting the desert, Gary Polis, arguably the world's most experienced scorpion handler, grabs a towel for the shower. A small but dangerous *Centruroides* hiding in the folds of the towel stings him on the index finger. Despite Polis' numerous warnings to his students about scorpion habits, the grand master has let his guard down for just a moment—long enough for the two-inch scorpion to surprise him. In moments, fire shoots up his arm. Once the pain subsides, he says that it's like ten flaming needles rotating inside you all at once.

I remember reading zoologist J. L. Cloudsley-Thompson's description of death by scorpion sting: "First, a feeling of tightness develops in the throat so that the victim tries to clear his throat of an imaginary phlegm. . . . The victim next becomes restless and there may be slight, involuntary twitching of the muscles. . . . Convulsions follow, the arms are flailed about and the extremities become quite blue before death occurs." The bulbous organ that includes the stinger, known as the telson, contains some of the world's most toxic poisons. Complex arrays of proteins that scientists have only just begun to identify, they carry a potency 100,000 times that of cyanide. For the scorpion, it's a powerful venom that helps it subdue a host of prey, including spiders, other scorpions, snakes, lizards and rodents. Only about 25 of the reported 1,500 species, however, are potentially lethal to humans, especially to children and older people. Most scorpions deliver a sting less severe than that of a bee.

Although Polis remains understated about the pain, I notice that his arm lies limp at his side. Later that day when something brushes against his fingertips, he moves quickly and grimaces, explaining that it feels like a jolt of electricity sending pinpricks and needles shooting up his arm. It takes three days to fade.

The sting doesn't keep Polis from his appointed rounds to some small islands, where he's in the 12th year of documenting scorpion and spider densities for a study of ecology and population dynamics. The arid, desolate and uninhabited islands stretching between Bahía de Los Angeles on Baja and Guaymas in Sonora are rarely visited, because of their lack of water and the variable weather conditions of the Sea of Cortés. On them, Polis stumbled upon an interesting fact: they contain from 2 to 25 times the scorpion densities that are found on the mainland.

By studying population densities over the years, Polis believes he's discovered the reason for these high numbers. To show me the evidence for his theory, we take a boat out to an island in the chain. The desolate rocky rise is painted white with pelican droppings; a handful of cholla cactus represents the only major plant life. As we walk the thin lip of beach, it's hard to avoid piles of seaweed, dead seabirds and other organic debris. The windrows serve as a food source for small organisms, which in turn feed spiders and scorpions. Terrestrial arthropods are, in effect, being sustained by the sea.

Polis believes that the field of ecology, lately dominated by mathematics, is changing as he and other empiricists demonstrate the subtle interplay of life. Nature is far more complicated than we ever imagined.

A week earlier, in the Baja desert, I stand near the van with a group of biologists, tired after a night of wrangling scorpions. The constellation Scorpius emerges over the horizon, with Jupiter above its shoulder.

In true field biologist style, Vanderbilt grad student Joe Barnes speculates about whether the constellation appears to be more male or female. He's half in jest, half serious. The length of its tail clearly suggests a male, he states definitively. He's finally hooted down when he claims it must be a *Centruroides.*

As the scientists argue and laugh, I turn 180 degrees to where Orion had disappeared over the horizon before darkness fell, chased by Scorpius. According to Greek myth, the mighty hunter Orion once boasted that he would prove his strength by hunting and killing every animal on Earth; in one version it was the scorpion that saved the day by stinging him to death. The gods immortalized the scorpion as a constellation. For eternity, when Scorpius rises, Orion sets.

That night, as I fall asleep looking at Scorpius, I reflect that millions of scorpions are watching the stars now, too. With all we know now about the scorpion, I ponder whether it has been unfairly maligned through the ages. Maybe so, I think, but then I look down and realize that I'm sleeping in my boots again.

Sturdy boots are a must for such work. But this individual is nonlethal to humans, as are most species.

DEFIXIONES R Vs
CVRSES WHILE V WAIT...
BINDING SPELLS
LOVE POTIONS
HEXES

By John Fleischman

When they put it in writing, they were cursing, not cussing

In ancient times, those in the know called on the numerous spirits of the underworld to make their curses, hexes and spells come true

Your neighbor has a noisy car or an earsplitting stereo. Your boss pitches a fit once a week just to keep the staff trembling. Your heart's desire acts as if you don't exist. You're due in court. Or perhaps you have drug dealers operating openly on the street, the way the people in the Bywater neighborhood of New Orleans did last summer. They needed something to put the heat on the criminal element without calling down retaliation on their own heads. The people of Bywater needed a professional curse. So what did they do? They called out drummers, dancers, torchbearers, a fire-eater and a voodoo priestess to summon the Haitian warrior god Ogoun La Flambeau to dispense with the local pushers.

Pliny the Elder (SMITHSONIAN, November 1995) would have understood that. Mind you, Pliny the Elder did not approve of professional spellbinders, yet he could not deny their appeal. "This most fraudulent of arts has held complete sway throughout the world for many years," he thundered. "Nobody should be surprised at the greatness of its influence." Pliny was a man of his time and, the time being nearly 2,000 years ago, he knew the reputation of the Roman magicians who wrote out elaborate curses on lead tablets called *defixiones*. "There is no one who does not fear to be spellbound by curse tablets," he declared.

All over the Greco-Roman world, the fearful and the covetous hired magicians to write out *defixiones*.

Unlike the milk of human kindness, ill will has never been in short supply, from Pliny's Rome to our America. Indeed, cursing may be a primordial human impulse, along with making war, lying and feeling sorry for ourselves. Although we may be plumbing new depths in vulgar language these days, when it comes to true cursing, we're a bunch of rank amateurs. Worse, we don't even know where to turn for help. Pliny's neighbors had a whole profession at their service.

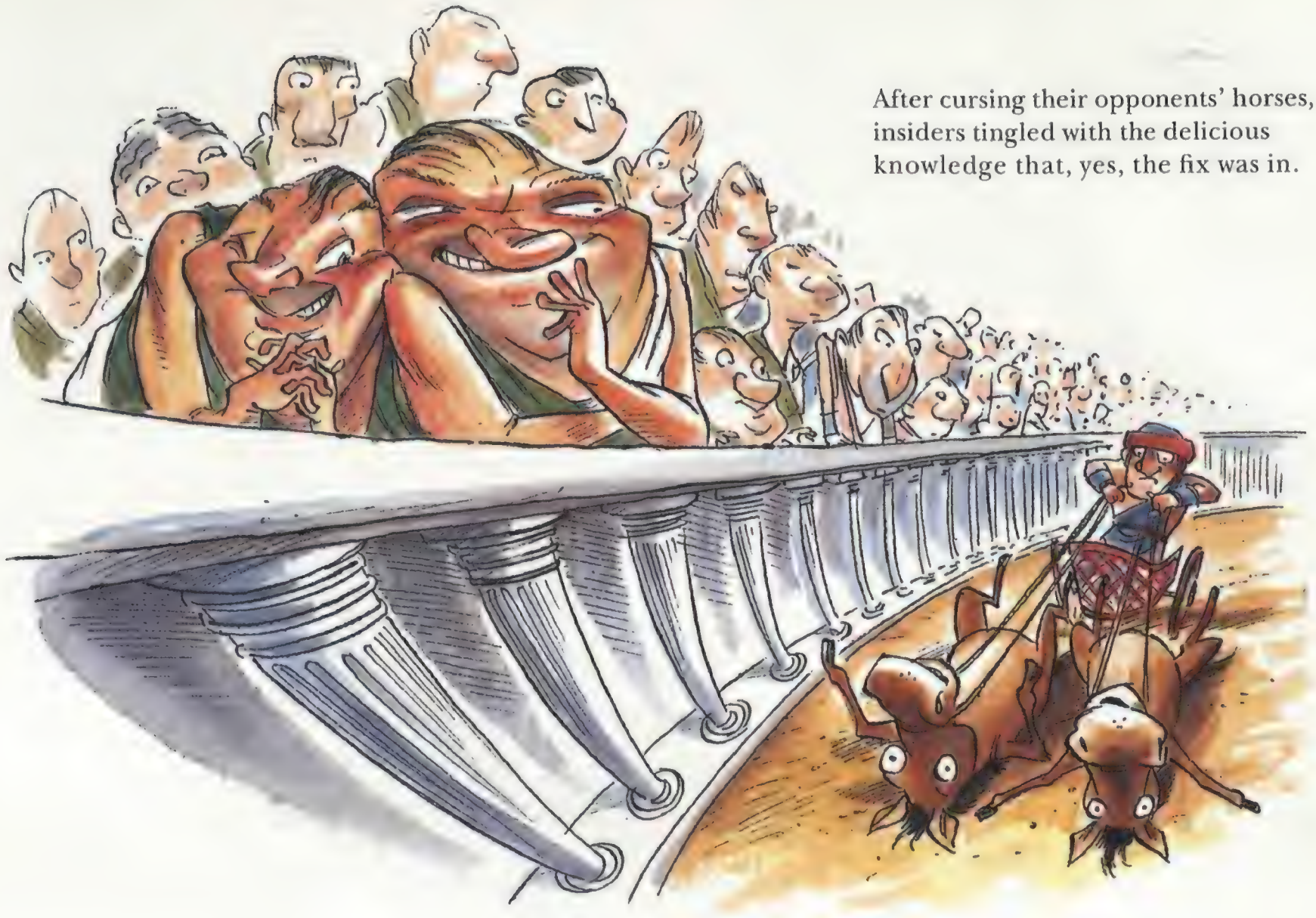
All over the ancient Greco-Roman world, from Syria to Spain, from Libya to Britain, the fearful and the covetous hired magicians to write out defixiones. Moonlighting scribes copied curses from "magical" papyruses that provided fill-in-the-blank spells complete with instructions, almost like curse cookbooks.

It was a Greek invention—not cursing itself but the very Greek idea of writing out curses on soft, cheap and relatively imperishable lead. Concealed in a racecourse, tossed down a well or placed in an "unquiet" grave, *katadesmoi*, as the Greeks called their curse tablets, were entrusted to the spirits of the underworld to be put into effect. Egyptians, Persians, Jews, Christians, Gauls and Britons—they, too, wrote curse tablets, shamelessly invoking each other's gods. Archaeologists are still digging them up, and scholars are translating and compiling them, feeding a growing modern interest in ancient *magika*, as the whole field is known. Scholars say the texts offer a rare view of "non-elites" in classical society. They mirror the worst fears of ordinary people struggling with abusive bosses, commercial rivals, opponents with too much talent, horses with too little speed and the eternal lonely heart.

From our perch on the brink of the 21st century, we can still hear Pancharia, a woman of fourth-century Palestine, enlisting supernatural help to forestall an audit: "Lord angels, muzzle and subject and render subservient and bind and slave and restrain and tie up Sarmation, to whom Oursa gave birth, and Val[entia], to whom Eva gave birth, and Saramanas, to whom Eusebis gave birth . . . choking them, tying up their thoughts, their mind, their hearts, their intention, lest they inquire further after an account or a calculation or anything else. . . ." We can feel the desperation of the slave Politoria in fourth-century Rome, who feared she would be sold into a notorious workhouse for unruly slaves: "Lord Gods, restrain the matron of the workhouse, Clodia Valeria Sophrone, and do not let her drag Politoria, to suffer the fate of lifelessness [there]."

Even after 1,700 years, another curse tablet still exudes malice for the Red and the Blue chariot teams set to run in the Carthage hippodrome. The horses had names like Silvanus, Servator, Rapidus, Euphrates and Sanctus. The drivers were Euprepes, son of Telesphoros, and Gentius, Felix, Lamuros and Dionusios. The tablet, which was found nailed into place under the

Illustrations by Daniel Vasconcellos



After cursing their opponents' horses, insiders tingled with the delicious knowledge that, yes, the fix was in.

starting gate, asks the gods to fix the race this way: "Bind the horses whose names and images on this implement I entrust to you. . . . Bind their running, their power, their soul, their onrush, their speed. Take away their victory, entangle their feet, hinder them, hobble them, so that tomorrow morning in the hippodrome they are not able to run or walk about, or win, or go out of the starting gates, or advance either on the racecourse or track but may they fall with their drivers."

Imagine the morning of that third-century day at the races. The stands of the Carthage hippodrome seethe with the rabid, highly organized color factions, the supporters of the White and the Green jeering at the fans of the Red and the Blue. And just before the start, perhaps the Red driver Dionusios lightly scrapes the wall with his hub, or perhaps the horse Rapidus shies. On the White and the Green benches, supporters exchange knowing glances, tingling with the delicious knowledge that, yes, the fix is in.

"Curse tablets are a subject that historians have often chosen to ignore," says John Gager, professor of religion at Princeton University and editor of a wonderful collection of translations and commentary, *Curse Tablets and Binding Spells from the Ancient World* (Oxford University Press). Yet in ancient Mediterranean culture, everyone used them or knew of them at every level of society, from slaves to patricians. The ruling classes were inclined to regard defixiones as subversive, according to Gager, because they symbolized a world where emperors, senators and bishops were not in control. Nevertheless, the writing of curses flourished until the early Christian church fathers finally snuffed them out.

The best minds of the ancient world condemned the writing of curses. Plato complained: "Begging priests and soothsayers go to the doors of the wealthy and convince them that if you want to harm an enemy, at very little expense, whether he deserves it or not, they will persuade the gods through charms and binding spells to do your bidding." Although Plato did not believe in spells, he said there was no use trying to reason with men who were "disturbed in their minds at the sight of waxen images fixed at their doors, or in a place where three roads meet or on the graves of their parents." It was such a nasty business that Plato urged extreme measures to curb it—putting professional curse writers to death and heavily fining or punishing their clients.

Strictly speaking, a *defixio* is a "binding spell," a hex that ensnares opponents in a supernatural net. "We call defixiones 'curses' but they are not entirely that," explains Holt Parker, professor of classics at the University of Cincinnati. "The connotation of a curse is that it is a bad wish, and not all defixiones are asking for bad

Cincinnati author John Fleischman, who has written for SMITHSONIAN *about Bronze Age Troy and classical Athens, often wonders if there's a curse on his car.*

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Strictly speaking, a *defixio* is a "binding spell" that ensnares opponents or loved ones in a supernatural net.

things to happen. They can be love spells, for example."

Thanks to a recently deciphered lead tablet, we can appreciate the ardor of Theon, who yearned for a woman named Euphemia during the fifth century in Egypt: "Grab Euphemia and lead her to me, Theon, loving me with a frenzied love, and bind her with bonds that are unbreakable, strong and adamantine, so that she loves me, Theon, and do not allow her to eat, drink, sleep or joke or laugh but make [her] rush out of every place and dwelling, abandon father, mother, brothers and sisters, until she comes to me, Theon, loving me, wanting me [with a] divine, unceasing and a wild love. And if she holds someone else to her bosom, let her put him out, forget him, and hate him, but love, desire, and want me. . . . Now, now. Quickly, quickly."

Parker's interest in ancient magika extends not only to love potions but also to contraceptives, fertility nostrums and fortune-telling. He is now eagerly waiting to read 50 "new" defixiones, unearthed two summers ago in Israel by his wife, Barbara Burrell. She is the field director for the University of Pennsylvania's excavations at ancient Caesarea Maritima on the Mediterranean coast, north of Tel Aviv. The tablets were recovered from a late-Roman well in a palace courtyard where Burrell believes imperial governors dispensed justice. That makes Burrell think her tablets may be "legal" curses, meant to literally tie the tongues of opponents during litigation. But because the Caesarea defixiones have yet to be thoroughly cleaned, only a single word repeated on one of them has been clearly read: "*brakbakbrakbak* . . ." Parker recognized it immediately. It's a "word of power," akin to the famous magic words *abraxas* and *abracadabra.* It's a name to conjure with, Parker says.

The Israeli government gave Burrell permission to fly the tablets, some still rolled up like small cigars, to the United States for treatment. They went first to the University of Pennsylvania Museum in Philadelphia for photographing and repacking. Then some went to the Smithsonian's Freer Gallery, where conservator Stephen Koob began analyzing the metal and corrosive products to determine what treatments will allow the tablets to be unrolled with the least damage. Now a Chicago-based archaeological conservator, Christine Del Re, is trying to stabilize the corrosion, back the weak tablets with adhesive tissue and slowly open them. After that, Holt Parker will train a stereoscopic microscope on the flattened tablets and, using a strong light to throw the scratched letters into relief, try to decipher them.

Calling down eternal damnation wasn't the ancient style in curses, says Parker. Curse tablets were carefully targeted. John Gager's book of spells, for example, contains this narrowly focused hex: "I bind Kallias, the shop/tavern keeper who is one of my neighbors and his wife, Thraitta, and the shop/tavern of the bald man and the shop/tavern of Anthemion and Pilon the shop/tavern keeper. Of all of these I bind the soul, the work, the hands and the feet; and their shop/taverns. . . . The soul, hands, tongue, feet and mind: all of these I bind to Hermes the Restrainer. . . ." The individual who had this spell cast in Attica in the fourth century B.C. was almost certainly a competing tavern owner. Interestingly, though, he was not out to utterly ruin his competitors so much as to slow them down. Maybe it was a preemptive strike, Parker suggests, to bind his neighbors before they could bind him.

Among the curse tablets discovered during excavations of Roman wells in Athens is one that appealed to a variety of deities to sabotage the performance of a wrestler named Eutuchamos: ". . . destroy the wrestling which he is about to do . . . this coming Friday . . . in order that he may fall down and make a fool of himself." That's pretty mild stuff compared with the troubles called down on an unnamed target by a curse found on an inscribed bowl, rather than a lead tablet, from Mesopotamia. Appealing to certain spirits, the curse requests that the target's "tongue may dry up in his mouth . . . that his legs may dry up, that sulfur and fire may burn in him, that his body may be struck by scalding, that he may be choked, estranged, and disturbed in the eyes of all who see him, and that he may be banned, broken, lost, finished, vanquished, and that he may die, and that a flame may come upon him from heaven and shivers may seize him and a fracture catch him and a rebuke burn in him."

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If the Caesarea tablets do turn out to be legal curses, they could throw light on one of the hottest issues in the classics right now—the role of women in the ancient world. Earlier curse-tablet discoveries, says Gager, have already revised the traditional view, revealing that women were much more active in public life than scholars had ever imagined. In defixiones, women curse and are cursed at, not solely as love objects but as business proprietors and court witnesses.

Somewhat unnerving to traditional scholarship, says Gager, is the notion that the curse tablets actually worked. Of course, the usual assumption has been that they did not. But surely they must have worked in some sense on accursed "orators," or lawyers, who stood up in court and found themselves speechless. Cicero reported facing one such opponent in an important lawsuit. The man forgot which case he was arguing and blamed "spells and curses" for his trouble. In a more general sense, defixiones worked in society at large, according to Gager, as a way of explaining personal misfortune and excusing public failures. Writing curses also gave the "little people" a sense of being able to do something to even the odds in a society where the powerful got nearly all the breaks.

But wait. Here is a product that relieves stress and champions the underdog. Could the times be right for a modern comeback of defixiones? Astrology is bigger than ever. The bookstores are filled with volumes on New Age spiritualism and the occult. Barbara Burrell recently noticed a row of paperbacks featuring a favorite deity of the curse tablets, the Egyptian god Thoth, who is identified with Hermes Trismegistos, a messenger of the gods. If Thoth can be repackaged, why not lead curse tablets? "I wouldn't put anything past people these days," says Burrell.

The people of New Orleans are way ahead of her. Last summer, the public curse laid on drug dealers in the Bywater district had immediate effects, at least according to Sallie Ann Glassman, the voodoo practitioner who summoned the Haitian warrior god Ogoun La Flambeau to Piety Street with chants, rum, gunpowder and graveyard dust. "There was a tremendous reduction in crime," she says. "We went from about 50 robberies a month to about 8 a month." Several drug dealers left and one came to sit on Glassman's porch and swear off his evil ways.

But now crime is rising again, Glassman reports. "The spell I cast has gradually worn off. We've had neighbors come in and say we're going to have to do it again." Even a good curse, it seems, doesn't last forever.

One curse tablet implored various deities to make a certain wrestler "fall down and make a fool of himself."

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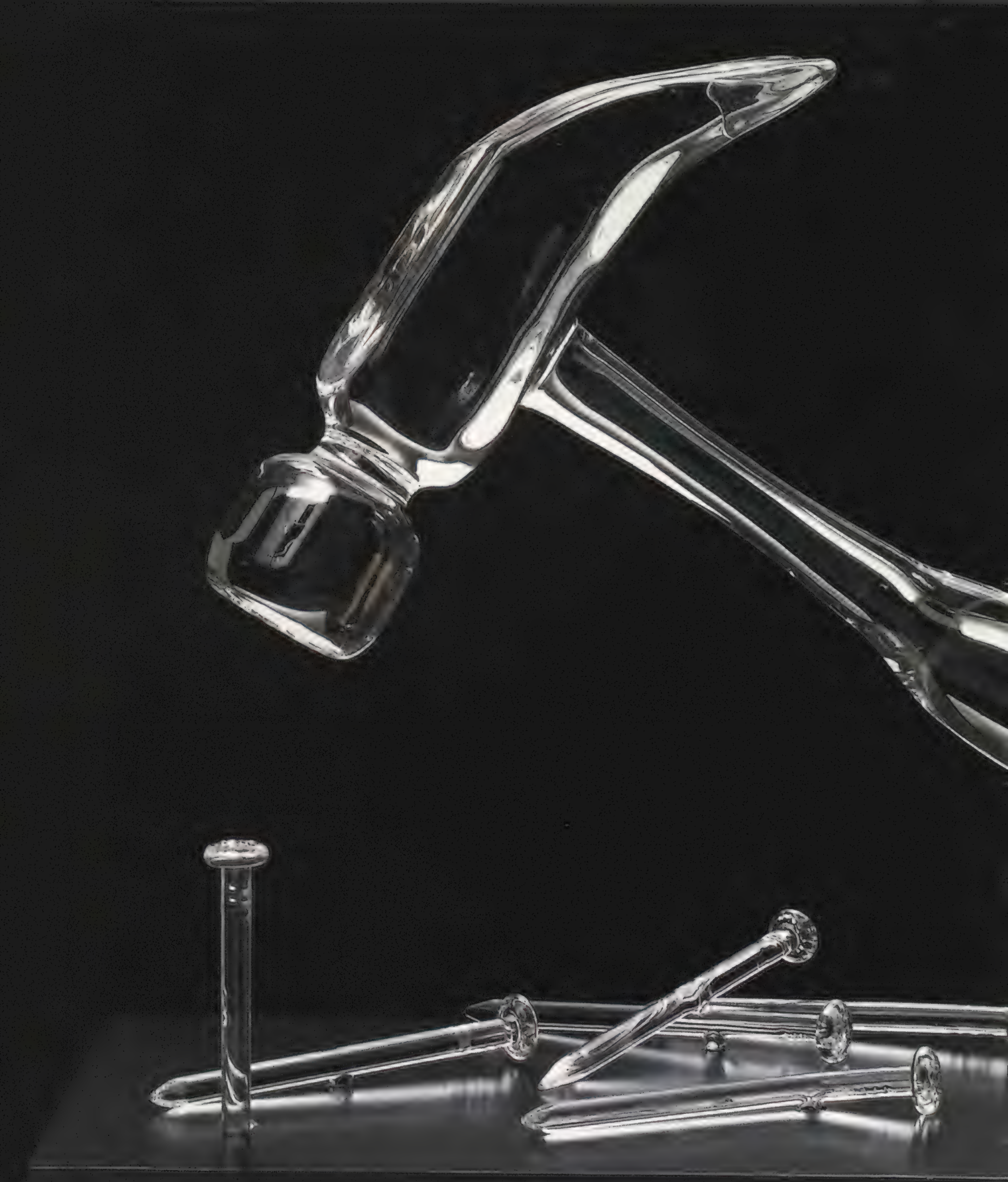

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Welcome to the Hechinger Collection, where hammers are brittle, saws never get old and wrenches mimic baby birds

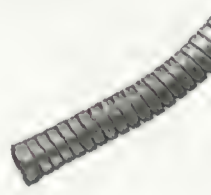
Tools are beautiful as well as useful. But, as John Hechinger notes, when we pick up a tool, "in a sense . . . it disappears. We care only about how well it functions, not its form." Hechinger had that in mind in 1978 when the Hechinger Company, which began as a single hardware store and is now a national chain, got a new headquarters building and the place needed some decoration. He began buying sculptures and paintings—but not in the usual way. He wanted single-subject art, and the appropriate subject was tools. Single tools, tools in clusters, tools artfully depicted or twisted by craft and imagination to tickle the fancy and please the eye of the beholder.

The result of Hechinger's quest is a 300-piece collection, lately offered to the public in the form of a cheerful and provocative volume published by Harry N. Abrams. Entitled *Tools As Art*, it is a cross between an Alice-in-Wonderland hardware store and a primer on the materials of modern art. In short, something that legions of wives and children may buy for husbands and fathers at Christmas and then keep around for family browsing like a collection of Gary Larson cartoons.

Most of the pictures and sculptures were done by Americans since World War II. They appeal to hardware fans as well as people who are strangers to the tenacity of the lowly C-clamp and the high snarl of the power saw. The collection includes all kinds of flavors and styles, from folk art to Pop Art and beyond. Many of the artists are famous, among them Jim Dine, Claes Oldenburg, Jacob Lawrence. Some are virtually unknown. In general the sculptures carry more punch (and more punning in the titles) than the paintings. Tool sculpture provides license to exploit a bemusing array of materials—from rock and balsa wood to cast-bronze—with the artful results ranging from a glass hammer and nails (left) to a pterodactyl with scythe-blade tail feathers, zigzag-saw wings and a gas-pump-nozzle beak, from sunbursts of handsaws to Arman's wall of welded steel and vise-grips, which stunningly simulates a school of silvery fish.

Texts by Hechinger and veteran writer Pete Hamill, and biographical notes on the artists, briefly and gracefully take up some old esthetic saws—among them the marriage of form and function—and describe the emergence of tools used to create art 17,000 years ago. The book is mostly free of the prolix jargon often used by art critics and curators in search of significance. It is about the principal charms of modern art: playfulness, wit, ingenuity, love of textures. As sculptor Constantin Brancusi put it: "Don't look for obscure formulas or mysteries. It is pure joy that I am giving you. Look until you see."
Timothy Foote

Hans Frabel's *Hammer and Nails* (shown here at life size) seems poised for shattering consequences.



Tool and hardware art in the Hechinger Collection includes (clockwise from right) *Saw Bird* by Mark Blumenstein (gas nozzle, saw and scythe blades), *Still Hungry* by Arman (bronze-plated wrenches), *Zen Saw II* by John Mansfield (rock, rice paper, balsa wood), *Mr. Goody Two Shoes' Tool Shed* by Roy Superior (wood, bone, brass), *Paint Can with Brush* by Phyllis Yes (mixed media), *Chair Maker's Chair* by Daniel Mack (mixed media with leather, sugar maple and tools).

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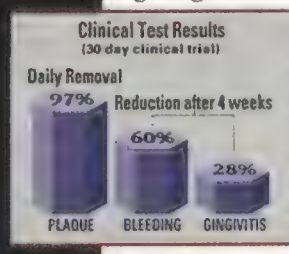

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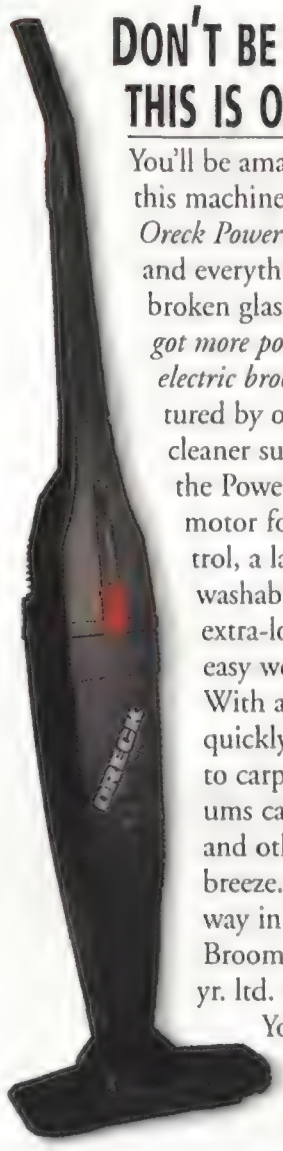

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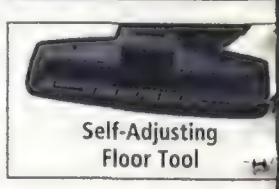

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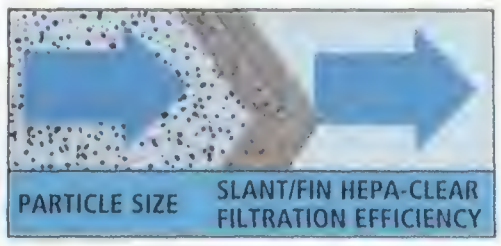

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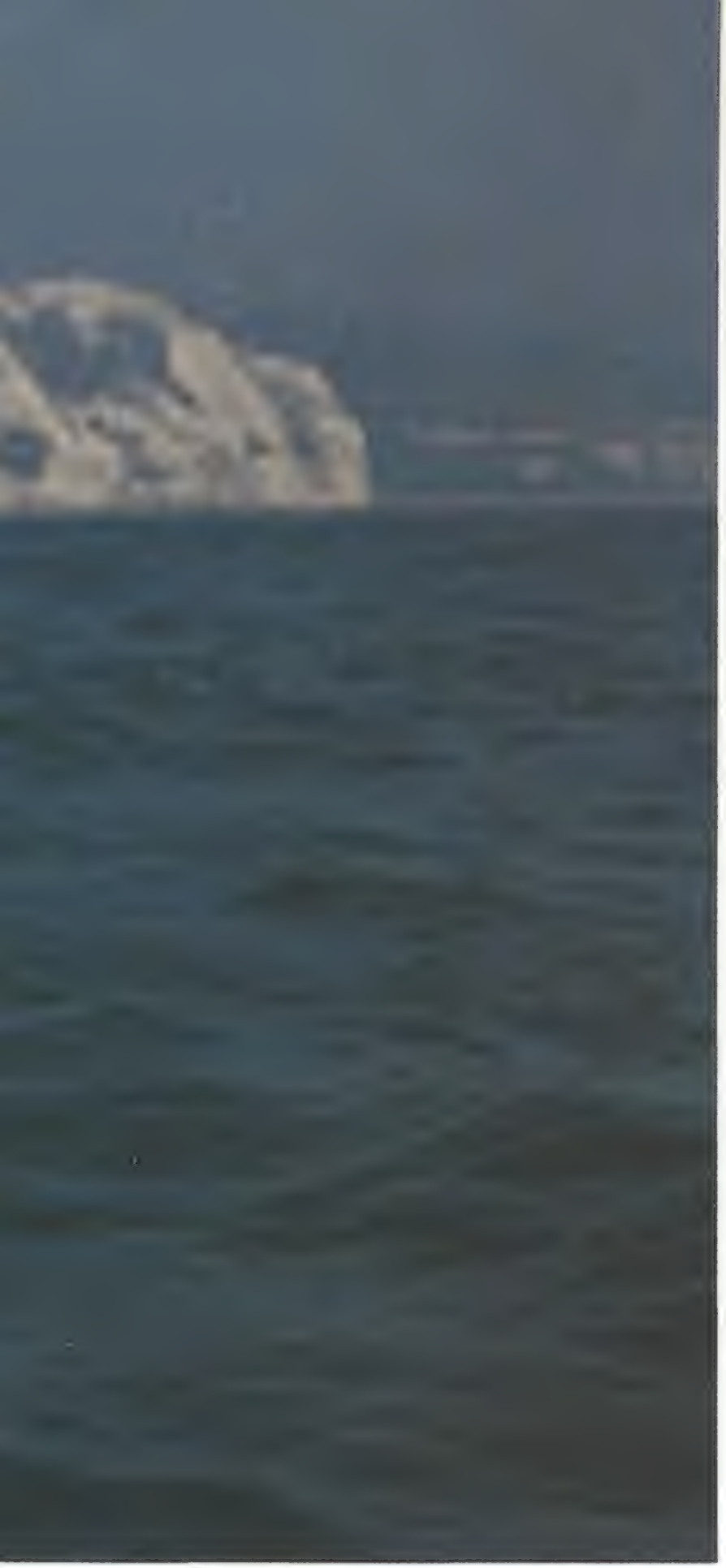
Backed by the white cliffs, Alison Streeter "pulls water" during one of her many cross-Channel swims.

By Joseph Harriss

When your arms get tired, you can't take the Chunnel

That chilly sleeve of water between Dover and Calais still exercises a tidal pull on the imaginations of marathon swimmers



Known as "Queen of the Channel," the Englishwoman has stroked her way to France 32 times—a world record.

Every time I raise my head to breathe, the cold blue-green chop slaps me in the face. Even for a veteran hotel pool swimmer like me that's unsettling, especially with the water in Dover Harbor a bone-chilling 60 degrees. When I make out an eight-story building coming straight at me, throwing up a curling bow-wave, I head for the beach. By the time I reach it, the building, actually a Sealink ferry in from Calais, has turned into her berth. As I walk shivering but safe on the beach's painful egg-size pebbles, I discard any illusions about spending a day swimming across the English Channel. I'd been in the water just 25 minutes.

This brief experience stirs mixed feelings about the swimmers gathered here expressly to consign themselves for hours to the hazards of a private Channel crossing. First reaction: they must be crazy. Second reaction: crazy or not, they have plenty of guts. I find them at one end of the beach, far from the crowd of leathery-skinned grannies and squealing kids that clutter the dark sands of Dover. Sheltered among them, removed from the racket of hovercraft and ferries coming and going, is Alison Streeter, known hereabouts as "Queen of the Channel." A rotund, compact dynamo with a disarming grin, she has swum the 21.5 miles from Dover to France an awe-inspiring 30 times by summer 1995.

She is the only woman to have done a "three-way swim"—Dover to Calais to Dover and back. The July day I meet her on the beach, Streeter has just completed the third two-way of her career. She is still wearing an elastic support from wrist to elbow on her left arm. "It got very choppy when the wind changed on the way back from France," she explains. "I was pulling so hard I strained the tendons in my left wrist by bending it down too far. You've got to get maximum pull with each stroke." With more than a million maximum-pull strokes in the Channel since her first crossing in 1982 at age 18, Streeter has been the women's champ since a 20th crossing in 1992, a year when she did a record seven in a row. "I started thinking, it's the English Channel after all, so a British girl should have the record," she says with the grin. I make a date to go along on the support boat for her next try, aimed at tying the world record.

At 10 A.M. other Channel swimming stars are donning swimsuits beneath beach towels and pulling on goggles and red or yellow silicone bathing caps—imprinted with the swaggering message, "When the going gets tough, sprinters get out." They grease themselves with a mix of lanolin and petrolatum bought for £7 a jar at the Boots drugstore in Biggin Street. Like elites everywhere, they kid around with insider jokes. The kidding is mainly things like who's put on the most body fat and what the crazy Channel weather will do. One of them borrows a ballpoint pen and sticks it in his suit so he can mark warm-up laps on his left hand. For Channel swimmers in training, a lap is 1,000 yards from one end of Dover's harbor to the other. They do that for four to eight hours, stopping each hour to chug carbohydrate drinks (mostly glucose) for quick energy. One of the women on a break stands at water's edge shivering so hard she sloshes the drink out. Finally she steadies the paper cup with both hands long enough to gulp it down before plunging in for another hour.

They all train with astonishing single-mindedness for their individual assaults on what is legitimately known as

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the Everest of swimming. As Edmund Acevedo, a professor of physical education research at the University of New Orleans who has made two unsuccessful tries, notes, "Because of the distance, the steady threat of hypothermia, the unpredictable weather, and the constant need for energy replacement, swimming the English Channel is arguably the ultimate endurance challenge." Thomas Hetzel, a former New York City police detective and a member of the International Swimming Hall of Fame, puts it another way. Among marathon swimmers, he makes clear, you're not considered great until you've done the English Channel.

What they win, besides this obscure greatness, is the right to pay $100 for a vellum certificate, having already paid $2,000 to register and be accompanied by a boat. Acevedo has delved into the

A 1920s newspaper poster detailing the exploits of early Channel swimmers showed the feeding method that sustained American Charles Toth in 1923.

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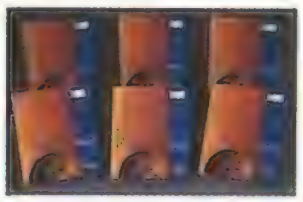

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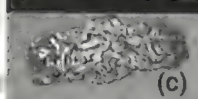

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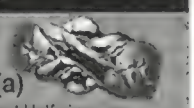

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psychology of the Channel swim and found that those who succeed feel "the triumph/euphoria typical of a peak experience." After his 1972 triumph Ted Keenan, from Enniskillen, Northern Ireland, was so euphoric that he named his brand-new daughter Chanele.

Acevedo also reported "disappointment and loss of goal direction later on." Presumably the vellum certificate on the wall cushions disappointment. But one skipper who regularly accompanies the swimmers across shakes his head. "It's a strange sort of pleasure to endure hours in cold water knowing you've spent over a thousand pounds for the privilege," he says.

Whatever the pleasure, it comes, if it comes at all, after considerable pain. Yet lone swimmers from 42 countries have struggled across the Channel some 750 times, including 22 two-ways and three three-ways. Francophobes will be pleased to learn that only six French citizens have swum the Channel, perhaps because in France, British eccentricities are disdained. Besides, the sunny Mediterranean is considered much more civilized than La Manche. In all, some 4,400 people have made more than 6,300 attempts, amply demonstrating the kind of tidal pull these 21.5 watery miles exercise on human imagination.

People as young as Britain's Thomas Gregory (11 years 11 months) and as old as Australia's Clifford Batt (67 years 240 days) have made it. The fastest man and woman are both American: Chad Hundeby (7 hours 17 minutes in 1994) and Penny Lee Dean (7 hours 40 minutes in 1978). Besides the solo swimmers, hundreds of others do hour-long legs as part of six-member relay teams, including the American team (p. 126).

Getting ready for her first crack at greatness—whatever it is—Karen Howard considers the swim's effects not on her body but on her home life, which, she admits, has disintegrated

Paris-based writer Joseph Harriss has reported for SMITHSONIAN *on the Académie Française (January 1990) and quilting (May 1987).*

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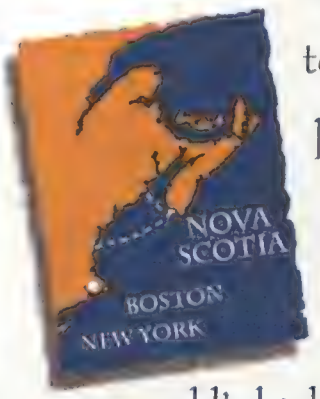

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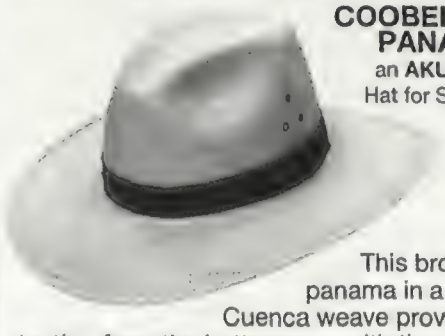

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In 1964, exhausted and defeated by powerful tides, Greta Anderson lets herself be hauled into a small rowboat after 18 hours in the water.

partly because of her swimming. "I started May 6 and haven't missed a weekend," she says. A suitably padded 45-year-old housewife from Gravesend, she didn't learn to swim until she was 40 and then fell in love with it. She wants to make it across for her son, Paul. "I'd love him to say, 'My mum swam the Channel.'"

Nearby, American John Selmer swings a scarlet towel down behind his back to exercise his shoulders. A friendly, graying, 6-foot-3-inch former naval officer who swam for the Naval Academy before being assigned to hunter-killer subs, he swims San Francisco Bay daily at 6 A.M. as a member of the Dolphin Club. "I turned 50 this year," Selmer says, "and this is how I'm celebrating it."

Channel swimmers take for granted things like sewage, oil slicks, patches of scratchy seaweed and dodging some of the 600 ships a day that pass through the Strait of Dover, one of the world's busiest shipping corridors. They know the salt water will make their tongues and throats swell, impeding their breathing; if enough gets into their stomachs, it will make them vomit. They also know they will fight the Channel's treacherous weather. The Strait's microclimate, encompassing two large landmasses, the North Sea and the Atlantic Ocean, is so capricious that Coast Guard forecasters often end official bulletins by saying "the *actual* conditions in Dover are . . ."

Complicating that are the tides that whip up and down the Channel, flooding into and out of the North Sea every six hours. The beach buzzes with stories of swimmers who have been tantalizingly close to the French coast after ten hours, only to struggle for another four hours with a flood tide carrying them sideways. Many have been pulled from the water dazed, exhausted and retching, done in with only a few hundred yards to go.

The main obstacle is the cold. With Channel water ranging from 55 to 63 degrees F, hypothermia accounts for about 80 percent of all failures. After a few hours in the water even the best swimmers can become confused and are unable to respond to simple questions from their escort pilot; lips turn

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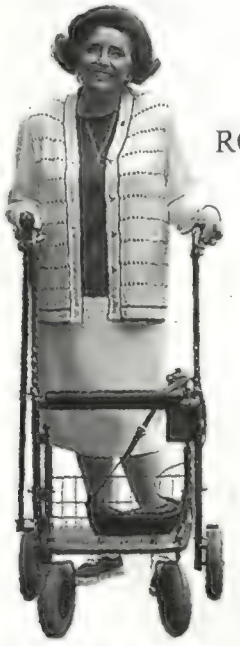

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blue, bodies shake uncontrollably. Adrien Moorhouse, a British Olympic swimming champ fresh from the 1992 Barcelona Games, lasted only two and a half hours due to the cold.

"If you miss the signs, they can lose consciousness quickly," says Barrie Darling, an ex-Sealink ferry captain who has escorted dozens of swimmers. In the 120 years that people have been doing this, two have died of hypothermia and exhaustion, notably the Brazilian champion Renata Agondi in 1988.

"The cold is what gives us women a natural advantage," says Alison Streeter, preparing for the water. "It's our higher percentage of body fat. Men are stronger but that's no help against cold." In real life Streeter is a mild-mannered currency trader (South African rands, Thai bahts) with a London bank, but when she exchanges her business suit for a swimsuit, she turns into a 5-foot-3-inch, 161-pound, fluid-drive swimming machine. Her usual 68 strokes a minute isn't particularly fast, and she has an elbow-flailing high recovery stroke that makes swimming coaches wince. But beneath her easygoing exterior is an athlete who never gives in.

In 1926 American Gertrude Ederle became first woman to swim across.

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Practicing 1,000-yard laps in sheltered waters, Americans John Selmer and Laura Burtch stay close to kayak paddled by their pilot.

"About an hour out," she says, "I start getting muscle pain in my shoulders, lower back and neck, and it lasts all the way. You just have to push through the pain barrier." She pushed through a lot on her three-way swim, a prodigious 34-hour, 40-minute effort in 1990 that earned her a place on the Queen's Birthday List as a Member of the British Empire. "The last two hours," she admits, "I was running on automatic. My wrists were bent so hard I strained all the tendons, my ankles were swollen double, and just at the end I got tangled up in a lobster pot."

The same mental mettle made her the first person to swim the North Channel from Scotland to Ireland, spending ten hours in water even colder than the Channel. In her spare time she's swum the 62 miles around the Isle of Wight, done two 28-mile swims around Manhattan Island and crawled down the Thames for 43 miles. "As I swam under Westminster Bridge, Big Ben struck 6 in the morning," she remembers pleasurably. "A couple of hours later I was under Tower Bridge just as dawn was breaking—it was a fantastic sight." Streeter, who sometimes listens to the latest exchange rates on the escort boat's radio to relieve the boredom of pulling water, has raised some $130,000 for leukemia and epilepsy charities in the last decade through sponsored swims.

Finally it is time for her record-tying swim. "They're forecasting a seven-knot wind and calm seas," announces Mike Oram. Oram is the burly, bearded captain of the *Aegean Blue*, a 30-foot cruiser with twin Volvo diesels that will take us to Abbot's Cliff, Streeter's take-off point, and then shepherd her across. Streeter now sports a T-shirt emblazoned "Alison Streeter's 1995 Channel Challenge" and purple-and-white sneakers. "Scampi Provençale and pasta at Dino's," she replies to my query about her training dinner. Breakfast was two pieces of toast.

On the way to Abbot's Cliff, a pebble strand beneath towering white chalk, she dons a black suit, tucks her short sandy curls under a white cap and lets her trainer-mother, Freda, slather some cream-colored grease on her neck and armpits to prevent chafing.

Abbot's Cliff is farther west than the usual starting point, Shakespeare Beach. Oram, who uses a computer to chart his courses, is compensating for a big seven-meter tide ripping up from the Atlantic Ocean. "The route is different for each swimmer because their speed determines when and where they'll hit the changing tides," he says. "To get from here to France all you have to do is steer a course of 150. But depending on the tides and wind, the actual route will be an S-curve or something even more complicated."

Some swimmers actually travel as much as 40 miles.

Alison is now following in the ancient wake of Captain Matthew Webb, a muscular, mustachioed shipmaster. A strong swimmer who once saved a seaman fallen overboard from a Cunard liner, he started the Channel swimming craze on August 25, 1875, when, on his second try, he made it across the Channel in a brisk 21 hours 45 minutes. At the official reception, Dover's proud mayor declared, "I do not believe that in the future history of the world any such feat will be performed by anybody else." He was right for 36 years, though 70 other brave souls gave it a try. Webb died in July 1883 while attempting to swim the rapids and whirlpools below Niagara Falls.

It was not until 1911 that one T. W. Burgess made it on his 12th try to become number two. Twelve more years passed before the third success was scored by a persistent American, Henry Sullivan, who thrashed for 26 hours 50 minutes—still the longest solo Channel swim ever made. Gertrude Ederle, one of America's best-known sports figures of the 1920s, astounded the world in August 1926, at age 19, by breaking the men's record by one hour and 54 minutes.

And suddenly the thing caught on, boosted by a £1,000 prize offered by London's *Daily Mail.* After a certain Dorothy Logan pocketed it by casually swimming out of sight to a waiting boat and being dropped off near the coast of France some hours later, the Channel Swimming Association was formed in 1927. Now the game had rules: swims must start from natural shore and end on shore or at cliffs, with swimmers entitled to food en route but not to touch either boat or helping hand. The only equipment permitted: non-insulating swimsuit, bathing cap, goggles, noseclip, earplugs, grease and a lightstick at night.

We watch Alison as she swims a few feet from the boat to the beach and waits for the starting signal from Barrie Darling, today's official observer. He glances at his stopwatch and drops his arm at 11:54 A.M. She starts her metronomic stroke, hands driving forward smoothly into the blue-green

Great physical handicap has been a challenge to Lucy Krajewska of Poland; despite missing legs, after two failed attempts she made it across in 1990.

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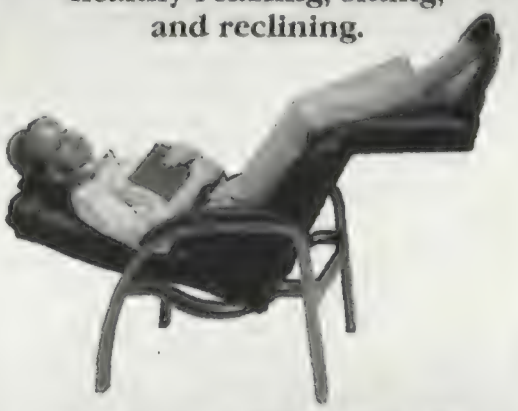

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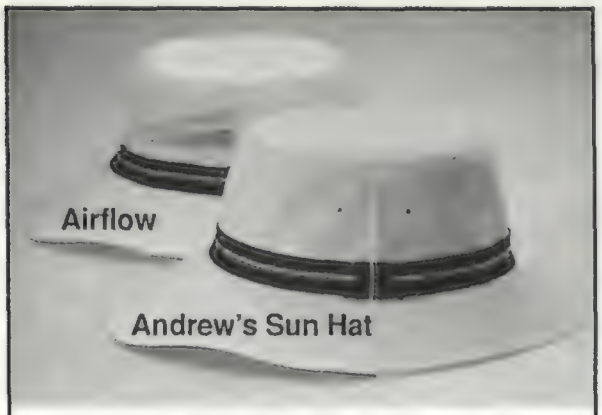

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The 1990 USA Relay Team included world's fastest Channel swimmers, Chad Hundeby (second from right) and, for women, Penny Lee Dean (front, center).

water, wrists bent, legs flutter-kicking just enough to keep her balance, making 2.2 knots. "All I ask is that they keep moving their arms and legs," cracks Oram, who's escorted more than 145 swims. "They pay me to be successful, not nice, and they swim better when they're mad." He's been known to lean over the side of his boat and yell "Get your head down and swim, you bastard!" at a flagging swimmer. His computer shows that in ideal conditions a swim could be done in 6.8 hours.

It's been done in practically every other time and way. A few years back England's Trevor James tried to swim the Channel blindfolded in 24 hours, spending the last 6 hours on the last mile. A 24-year-old Japanese woman named Joshi Kobayashi went to nearby Folkestone to study English, became fascinated by the Channel and decided to cross it. Problem was, she'd never really learned to swim properly. So she dog-paddled for 19 hours 47 minutes, fortifying herself along the way with white chocolate (and made it).

The first handicapped person to get across was American John Starrett, a spastic, in 1964. Twenty-eight-year-old Lucy Krajewska of Poland swam it without her artificial legs in 1990.

As Britain's closest point to the troublesome Continent, Dover has seen plenty of other history, starting when the conquering Romans dubbed it Dubris. The port is overlooked by its 800-year-old crenellated castle, from which Winston Churchill once watched Spitfires dogfight Messerschmitts during the Battle of Britain.

"Seven minutes to feed time," Darling shouts. In the heroic but gastronomically unscientific old days, swimmers used to snack on everything from beef sandwiches to rice pudding and whole roast chickens while treading water. One of them, they say, kept sandwiches in his bathing cap, dipping them in the water if the bread seemed dry. Today, Freda Streeter simply mixes a cup of pure maltodextrin carbohydrate drink with black currant flavoring, the energy equivalent of a plate of pasta. "This stuff has virtually revolutionized the swim," she says. "Besides diverting blood from the muscles to the stomach for digestion, eating solids costs up to an hour on a 12-hour swim." Exactly one hour after the start,

Oram grabs an ancient foghorn and blows. Alison swims over, takes the paper cup from Freda, gulps it down, and flips the cup over her head. The meal has taken 15 seconds.

The only locals who really pay attention to Channel swimmers are officers at the Dover Coast Guard station high above the cliffs. Watch officer Alan Martin presides over a series of big radar screens, where the English and French coasts are displayed as blue, the Channel black, with bright yellow vectors giving the location, direction and speed of passing ships. On any given day they include a cosmopolitan mix of the world's supertankers, freighters and container ships. Plus, of course, the scurrying ferries crossing their paths at right angles.

Despite its chaotic on-screen look, the Channel is a reasonably organized place. Vessels sailing down the Channel to the Atlantic on the British side follow the Southwest Lane. Those heading for the North Sea on the French side use the Northeast Lane. Between them, one mile wide, is the Separation Zone. Dozens of close calls occur every week, especially when skippers try to cut corners to save time and fuel. Dover Coast Guard keeps a benevolent eye out for swimmers, including giving position reports of swims-in-progress in its hourly shipping broadcast, adding prudently, "a wide berth is requested."

Two hours after our start, Dover Coast Guard crackles over the boat's radio: "Fog banks rolling in. Visibility reports of less than two miles requested on channel six-nine." The wind has shifted to south-southwest, freshening to force four, 15 knots. Whitecaps are forming. A three-foot chop slaps us from several directions, leaving the *Aegean Blue* wallowing uncomfortably. Hulking out of the summer haze comes *Faride,* a big red 60,000-ton bulk carrier out of Istanbul, cutting smoothly through the waves barely a hundred yards off our bow. I can see white-shirted officers on the bridge; one points an index finger at his tem-

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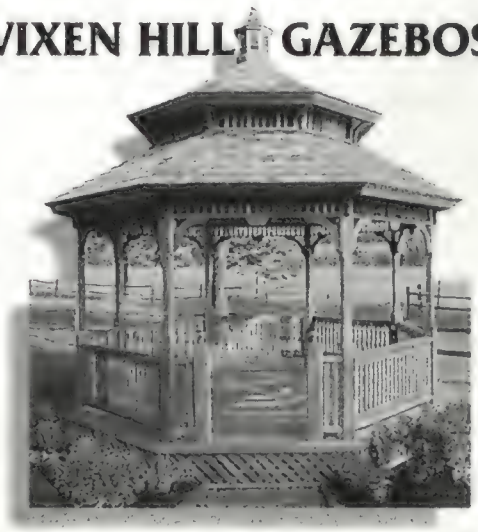

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ple in the universal sign of insanity.

Fortunately, there are few jellyfish. During one swim this summer, jellyfish tentacles slithered down the front of Alison's suit, pricking her skin for hours. Channel swimmers shrug off a few stings on arms and face as part of the fun, but jellyfish swarms, frequent in the Channel, are something else. Laura Burtch, an American who succeeded on her second try in 1994, told me about her first swim the year before: "Six hours into it I got stuck in a long swarm of jellyfish and was stung from head to toe. I went on for another three hours, but then I got a reaction to the stings and just bonked out." The Channel's other worrisome sea creature is the lamprey, an eel that can fasten its round mouth to a swimmer's leg. To pry a slippery lamprey loose, you grasp it firmly and pull hard, leaving a bloody circle on the skin.

Before starting, Alison joked that she hoped the Channel wouldn't be too calm and boring. Now, as she comes over for her fifth-hour feed, she says, "Definitely not boring." Big waves on our starboard quarter have broken her breathing rhythm and painfully checked her stroke each time she brings an arm forward. Sometimes, on the crest of a wave, she's actually looking down at us. "She's taking a beating out there," says Freda, starting to look worried. The wind is up to force six, 28 knots. The *Aegean Blue* pitches and rolls in stomach-churning figure eights. I stand amidships to minimize motion and brace myself on the back of Oram's seat, getting thrown to the deck when I let go to make a note. "Looks like a cold front has come through," says Oram. "Ah well, we like a challenge."

By now Alison is getting a cup of green mouthwash to counteract salt in her throat. "I promise you won't have to swim back," Oram yells to her over wind and waves. "But when do we get there, next Christmas?" she yells back. We are 15 miles up the coast from Cap Gris Nez, though Oram has been steering a steady course of 150 since we left.

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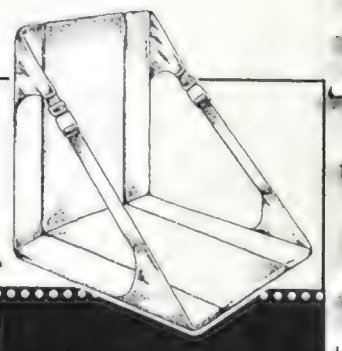

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When the boat rolls in the ten-foot waves, slanting the horizon at 45 degrees, its gunwales are inches from boiling foam. Dover Coast Guard comes on the loudspeaker: "Strong wind warning for coastal waters up to five nautical miles offshore. Southwesterly winds will reach force six with gusts to 30." Freda lies down on the deck. "Thirty crossings, and this is the closest I've ever come to being seasick." One of her daughter's friends already is, considerately leaning over the rail away from the side Alison is swimming on.

Nine and a half hours out, seven miles from France, Alison is still plugging away. But now she wears a lime-green chemical lightstick pinned to her suit so she can be seen in the dark. Freda asks Oram whether she should keep going. "She's taking in a lot of salt water. When I see her getting that beating I want her to come out." At the next feed, Oram leans over the port side and shouts, "Only you know how you feel. We can struggle on if you want, but the wind's at 30 knots and it'll be another three to five hours." Freda, clearly frightened, joins in: "Ali, be sensible for once and come out." Alison hesitantly treads water in our spotlight. Oram makes the decision. "As skipper, I'm telling you this is bloody ridiculous and you should get out now." Reluctantly, she climbs on board and collapses in a dejected heap on deck with a blanket around her. We all try to cheer her up. Oram guns the twin Volvos and steers for the flickering lights of Calais on the swaying horizon. Bitterly disappointed, Alison manages a brave grin. "Sorry guys. I guess nobody beats the Channel every time." She found better conditions on September 4, 1995. On that day, she crossed for the 32d time, in 10 hours 58 minutes, to become the new all-time Channel champion.

Alison Streeter exults after a successful crossing, as pals crack champagne. One of the great Channel swimmers, she's still going strong at age 31.

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Book Reviews

The Song of the Dodo
David Quammen
Scribner, $30

This is a book of physical adventure—travels in exotic and even dangerous places to see extraordinary creatures. It is also a book of intellectual adventure, in which the excitement of new understanding builds over 600 pages until at last the baton is passed to the reader. This is only fitting because the last sentence will leave more than a few readers on their feet, punching the air with a fist and saying "Yes!"

David Quammen is a Montana novelist who for the past 15 years has written a formidably researched column for *Outside* magazine. (The final one, on his fear that all surviving animals will end up as tame as city pigeons, appeared in the March issue.) For the past eight years he has traveled the world on a Guggenheim grant to see for himself some of the most endangered animals on the planet. For all those years and more he has been talking to biologists, sometimes in their university offices, other times on trails in Madagascar, in the Atlantic forest of Brazil, on what is left of Krakatau or on Guam at night, looking for brown tree snakes. He has walked Tasmanian trails where thylacines once roamed and been ambushed on a trail in Indonesia by a Komodo dragon.

His subject, Quammen says, is "the extinction of species in a world that has been hacked to pieces." To some, extinctions within an ecosystem are "relaxation to equilibrium." Others say "faunal collapse." Quammen prefers the phrase of the Smithsonian's Tom Lovejoy: "ecosystem decay."

He begins with travels in Indonesia,

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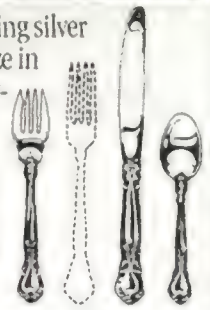

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following in the footsteps of the self-supporting British naturalist Alfred Russell Wallace, who figured out natural selection at the same time as Darwin. He spends time in the Galapagos. Baja California. Mauritius.

The book fills us in on some of the great field biologists, and little by little we become comfortable with the jargon, understanding adaptive radiation and trophic cascades. We follow their progress and their battles as they struggle to understand how life works.

A milestone in that saga comes in 1967 when Robert MacArthur and Edward O. Wilson publish a mathematical treatise called *The Theory of Island Biogeography.* (Biogeography is the study of what organisms live where—and why.) MacArthur and Wilson argue that the number of species on any given island represents a balance between immigration and extinction. The species themselves may change as some become extinct and new ones arrive, but there is for every island an equilibrium.

Quammen explains why islands are a good place to start. "Islands are distinct from mainlands in that they represent simplified, exaggerated versions . . . of exactly those evolutionary processes that occur on mainlands."

Wilson is no mere theorist. He and his then graduate student, Dan Simberloff, tested the theory in Florida Bay. They censused the insects on minute mangrove islands, then had a professional exterminator from Miami wrap the islands in canvas à la Christo and fumigate them. After several years they censused the islands again. Their insect populations all had equilibrated around their original numbers.

MacArthur and Wilson, of course, knew they were talking about more than islands surrounded by water: "Insularity is moreover a universal feature of biogeography." Four years later James H. Brown pointed to one example of non-equilibrium insular biogeography. The tops of mountains in the Far West's Great Basin are effectively islands, he said, with animals and plants from a colder time stranded there since the last Ice Age. These sky islands have no immigration, only extinction. This, Quammen concludes, is the phenomenon of ecosystem decay. And, he adds, the theory applies to all fragmented habitats, which means all habitats.

Quammen explains that on true islands, mammals tend toward dwarfism

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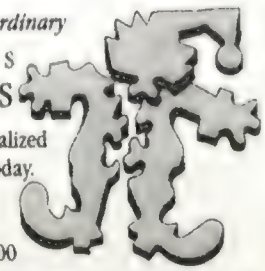

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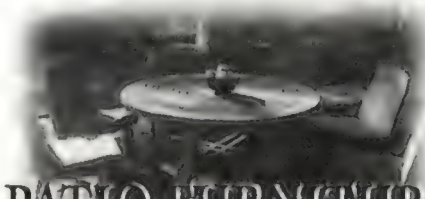

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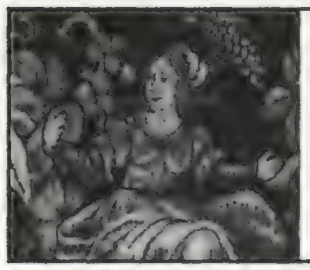
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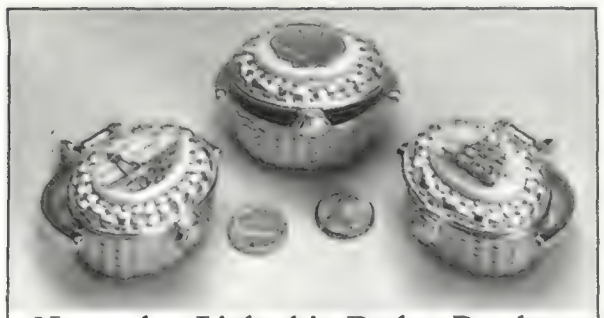
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and reptiles toward giantism. We know from fossil evidence that a pygmy elephant, only five feet high, once lived where the Komodo dragon does today. This juxtaposition led polymath Jared Diamond to speculate in a paper for *Nature*: "Did Komodo Dragons Evolve To Eat Pygmy Elephants?" Who could resist a title like that?

Michael Soulé explains that fragmentation also means the end of evolution for large vertebrates and plants (read trees). There is not enough room for existing species to split into new ones. So as existing species go extinct, from even the most natural of causes, none will be replaced. Earth itself is an island with no immigration.

Terminology has changed over the years. What was once "island biogeography" is now "population viability." Today there are scientists who call themselves "conservation biologists," who are being sought out by managers of public lands to solve Solomonic problems. The ultimate goal for conservation, Lovejoy says, is "intact, fully diverse ecosystems *persisting* in reserves." Whether any reserve in the world is actually large enough is not now known.

Nothing is perfect. One or two sections of the book are extraneous. Occasional coarse language jars by its contrast with the rest. The author can be coy, as when he bids us to close our eyes while he uses an equation, or when he tells us to relax because he is not going to burden us with pages and pages of details about a list he has just given. But on the whole it's a book that's going to be read for many years to come, even though it's too big to carry around as Quammen has toted Wallace's *The Malay Archipelago* for so many years.

The book ends back in Indonesia. Quammen has come to the remote islands of Aru, where Wallace once spent miserable weeks, feet rotting in the rain, trying to collect enough specimens, and thereby earn enough money, to keep going. Have the Aru islands been ecologically destroyed? Not yet. "There's still time," he writes. "If time is hope, there's still hope."

Whatever you do, don't skip to the end. Unless you have read all that leads up to it, you won't feel the full surge of joy in discovering what Quammen finds on Aru, the surge that brought me to my feet.

John P. Wiley jr. is a member of SMITHSONIAN's Board of Editors.

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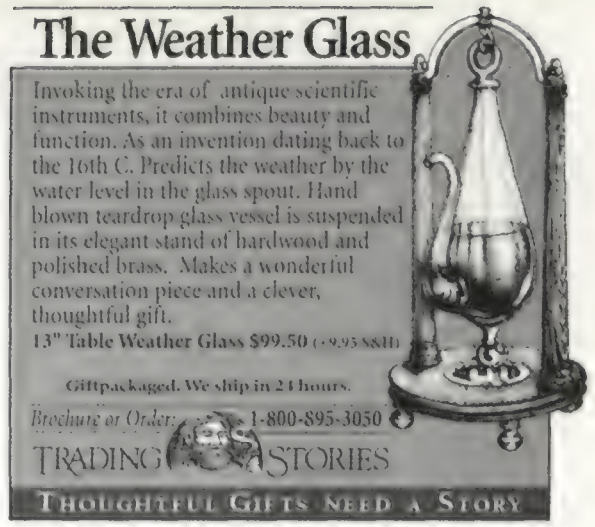
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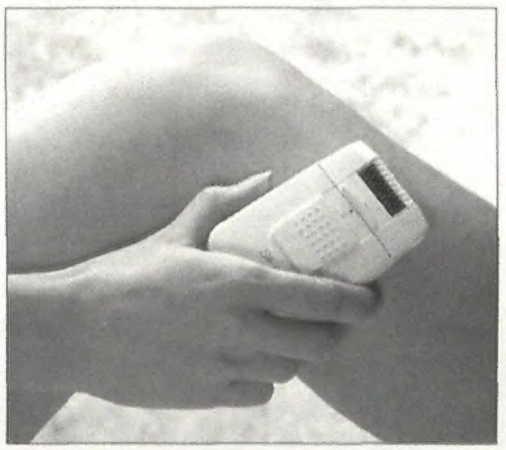

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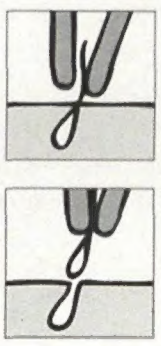

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By Bruce Watson

Speeding through the Great Books on the road to higher learning

On the wall of my mental library hangs a small poster with the following advice: "Read Great Books." The notice was hung there by My Mother the Teacher. Whenever I see it, the dutiful son in me awakens. "I will!" I shout. "*Allons*! I'll tackle *Ivanhoe* or the *Iliad*! I'll read a classic a week!"

But I'm only kidding myself. Some of those Great Books have hundreds of pages. Their mere titles contain words like "nichomachean," "wuthering," even "miserables." Who needs that kind of pressure? So I close my mental library, asking, "If they can put a man on the moon, why can't they devise a way to know Great Books without actually reading them?" Now they have.

The scene is somewhere on the Interstate. Traffic is thicker than the prose in *Silas Marner*. Other drivers are listening to talk radio, but *Allons*! I'm getting an education. Above the idle of engines a soothing voice on my tape deck recites: "Midway upon the journey of our life I found myself within a forest dark, for the straight-forward pathway had been lost. . . ." And beside me sits a box labeled "100 Great Books on Tape."

Dante's *Inferno, Bleak House, War and Peace*—each taped classic is streamlined into just 22 minutes, the exact length of the average commute. Why fuss with frills like adjectives or adverbs? Why diddle with metaphor or meaning? With "100 Great Books on Tape," I get the entire Western canon shot straight into my ear. I can "cram a lifetime of learning into 22 short minutes!" just as the ad promises.

My Mother the Teacher would scoff. How can a Great Book fit into 22 minutes? I admit I had doubts. Could I absorb *Don Quixote* while merging into the fast lane? How romantic would Keats sound on the Jersey Turnpike? But it's amazing what you can master while yielding the right-of-way. Ask me a classic, any classic. *Moby-Dick*? It's about whaling. *Beowulf* isn't about a real wolf. And *Treasure Island* has something to do with treasure. And an island. Mom might scoff, but this is more than I remembered when I didn't read these tomes in high school.

Now I'm cramming down two classics a day. When one tape ends, I just pop in another. No threatening tests, no embarrassing class discussions. At first, this took some getting used to. Finishing a tape, I'd roll down my window, pull alongside another car and shout, "Hey, listened to any good books lately?" Most drivers ignored me, but one guy held up his box of "Great Books on Tape." "I'm doing Thucydides today!" he shouted. "Know anything about it?" There on I-95, just south of Exit 17, we discussed the Peloponnesian War. Passing cars honked a Greek chorus.

The mark of a classic is discovery, my mother always said. Every time you pick up a Great Book, you see something different. The same is true on tape. One afternoon, absorbed in *Pride and Prejudice* (it concerns a woman who changes her mind about a guy), I failed to notice an "Exit Only" sign. Soon I was seeing a whole new world—strange streets, angry buses, a cast of characters straight out of Dickens. I should have turned off the tape and concentrated on making it back to the Interstate, but I had to know whether Elizabeth was going to accept Darcy's proposal. So I kept driving . . . To make a long story short, I ended up far from the madding crowd. I polished off Jane Austen, made short work of the *Aeneid* and was well into the *Critique of Pure Reason* just before I found an on-ramp. Literature marches on.

After I'd digested most of the classics, I bought other tapes for intellectual commuters. I hummed along with "100 Great Symphonic Minutes." I struggled to envision "100 Great Landscape Painters." "100 Great Surrealist Poets" was baffling, but "100 Great Nuclear Physicists" was more fun than it sounds. Turning to the practical side, I bought "100 Great Handyman Projects" and threw some tools in the car. Right there on I-95, I built a pretty decent whatnot shelf and a spice rack.

I was doing "100 Classical Aerobic Workouts" when I realized that a little learning can be a dangerous thing. The scene is still the Interstate, now homeward bound. My car is lurching in rhythm. Working on my calves, I'm flooring the accelerator in time to Mozart's *Eine kleine Nachtmusik. DUM* (lurch) *da-DUM* (lurch), *da-dum-da-dum-da DUM* (lurch). I'm not the only aerobic driver. The Lexus next to me is also doing Mozart. A couple of pickups up ahead are lurching to the Brahms Biceps Burn, and that guy in the Audi must be doing the Tchaikovsky Tummy Tuck to the tune of the *1812 Overture*. The cop could have pulled any of us over, but he picks me. "I couldn't have been doing over 80, officer," I tell him. "Even Mozart doesn't go that fast." I paid the ticket. But when I got another for doing 75 in a *William Tell Overture* zone, I decided to end my days as an autodidact. (See "100 Great Vocabulary Lessons on Tape," tape 3, side 2.)

Last month I gave all my tapes to the local library. On the wall was a poster. "Read Great Books." "Read?" I said to the librarian. "Interesting idea. *Allons*! Do you have *Ivanhoe*?" Sorry, she said, but people prefer listening to classics these days. Had I seen "100 Great Children's Books on Tape?" The first was *Treasure Island*. No thanks, I said. I've heard that one before.

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